CHEMISTRY

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

NEET

CHEMISTRY

1. For the cell reaction:

$2Fe^{3+}(aq) + 2l^{-}(aq) \rightarrow 2Fe^{2+}(aq) + l_2(aq)$

$E^{\ominus}_{cell} = 0.24V$ at $298K$. The rstandard gibbs energy $\left(\triangle, G^{\ominus} \right)$ of the cell reaction is

[Given that faraday constnat $F = 96400Cmol^{-1}$]

A. $23.16kJmol^{-1}$

B. $-46.32kJmol^{-1}$

C. $-23.16 kJmol^{-1}$

D. $46.32 kJmol^{-1}$

Answer: B

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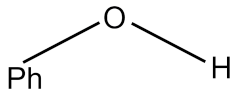
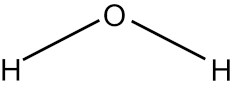
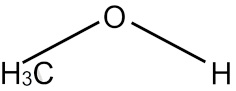
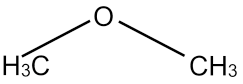
2. The compound that is most difficult protonate is

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: A

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3. The magnitude and permanganate ions are tetrahedral due to

A. The π- bonding involves overlap of d-orbitals of oxygen with d-orbitals of manganese.

B. The π - bonding involves overlap of p-orbitals of oxygen with d-orbitals of mangenese.

C. There is no π - bonding

D. The π - bonding involves overlap of p-orbitals of oxygen with p-orbitals of mangenese.

Answer: B

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4. The correct order of the basic strength of methyl substituted amines in aqueous solution is

A. $CH_3NH_2 > \left(CH_2\right)_2NH > \left(CH_3\right)_3N$

B. $\left(CH_3\right)_2NH > CH_3NH_2 > \left(CH_3\right)_3N$

C. $\left(CH_3\right)_3N > CH_3NH_2 > \left(CH_3\right)_2NH$

D. $\left(CH_3\right)_3N > \left(CH_3\right)_2NH > CH_3NH_2$

Answer: B

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5. An alkene "A" on reaction with O_3 and Zn gives propanone and ethanol in equimolar Addition of HCl to alkene "A" gives "B" as the product. The structure of product "B" is:

A. $H_3C - \underset{\displaystyle CH_3}{\underset{|}{CH}} | Cl - CH | CH_3$

B. $Cl - CH_2 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} | CH_3$

(3)

C. $H_3C - CH_2 - \underset{\displaystyle CH_2Cl}{\underset{|}{CH}} - CH_3$

D. $H_3C - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{C}} | Cl - CH_3$

Answer: D

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6. For the second period elements the correct increasing order of first io0nization enthalpy is:

A. $Li < Bt < B < C < O < N < F < Ne$

B. $Li < Be < B < C < N < O < F < Ne$

C. $Li > B < Be < C < O < N < F < Ne$

D. $Li < B < Be < C < N < O < F < Ne$

Answer: C

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7. A gas at 350 K and 15 bar has molar volume 20 percent smaller than that for an ideal gas under the same conditions. The correct option above

the gas and its compressibility factor (Z) is :

A. Z lt 1 and repulsive forces are dominant

B. Z gt 1 and attractive forces are dominant.

C. Z gt 1 and repulsive forces are dominant.

D. Z lt 1 and attractive forces are dominant

Answer: D

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8. For a cell involving one electron $E_{cell}^{0} = 0.59V$ and 298K, the equilibrium constant for the cell reaction is:

[Given that $\frac{2.303RT}{F} = 0.059V$ at $T = 298K$]

A. 1.0×10^{30}

B. 1.0×10^{2}

C. 1.0×10^{5}

D. 1.0×10^{10}

Answer: D

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9. Which will make basic buffer?

A. 100 mL of 0.1 M HCl + 100 mL of 0.1 M NaOH

B. 50 mL of 0.1 M NaOH + 25 mL of 0.1 M CH_3COOH

C. 100 mL of 0.1 M CH_3COOH + 100 mL of 0.1 M NaOH

D. 100 mL of 0.1 M HCl + 200 mL of 0.1 M NH_4OH

Answer: D

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10. Which is the correct thermal stability order of $H_2E(E = O, S, Se, Te$ and $Po)$?

A. $H_2Se < H_2Te < H_2Po < H_2O < H_2S$

B. $H_2S < H_2O < H_2Se < H_2Te < H_2Po$

C. $H_2O < H_2S < H_2Se < H_2Te < H_2Po$

D. $H_2Po < H_2Te < H_2Se < H_2S < H_2O$

Answer: D

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11. For an ideal solution, the correct option is:

A. $\triangle_{mix}G = 0$ at constant T and P

B. $\triangle_{mix}S = 0$ at constant T and P

C. $\triangle_{mix}V \neq 0$ at constant T and P

D. $\triangle_{mix}H = 0$ at constant T and P

Answer: D

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12. The biodegradable polymer is :

A. Buna-S

B. nylon-6,6

C. nylon 2-nylon 6

D. nylon-6

Answer: C

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13. Enzymes that utilize ATP in phosphate transfer require an alkaline erath metal (M) as the cofactor M is

A. Sr

B. Be

C. Mg

D. Ca

Answer: C

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14. If the rate constant for a first order reaction is k, the time (t) required for the completion of 99% of the reaction is given by :

A. $t = 2.303/k$

B. $t = 0.693/k$

C. $t = 6.909/k$

D. $t = 4.606/k$

Answer: D

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15. Which of the following diatomic molecular species has only π bonds according to Molecular orbital Theory

A. Be_2

B. O_2

C. N_2

D. C_2

Answer: D

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16. pH of a saturated solution of $Ca(OH)_2$ is 9. the solubility product $\left(K_{sp}\right)$ of $Ca(OH)_2$ is

A. 0.5×10^{-10}

B. 0.5×10^{-15}

C. 0.25×10^{-10}

D. 0.125×10^{-15}

Answer: B

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17. The mixture that forms maximum boiling azeotrope is :

A. Heptane + Octane

B. Water + Nitric acid

C. Ethanol + Water

D. Acetone + Carbon disulphide

Answer: B

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18. 4d, 5p, 5f and 6p orbitals are arranged in the order of decreasing energy. The correct option is :

A. 5f gt 6p gt 5p gt 4d

B. 5f gt 6p gt 5p gt 4d

C. 6p gt 5f gt 5p gt 4d

D. 6p gt 5f gt 4d gt 5p

Answer: B

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19. Which of the following is an amphoteric hydroxide

A. $Be\left(OH_2\right.$

B. $Sr(OH)_2$

C. $Ca(OH)_2$

D. $Mg(OH)_2$

Answer: A

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20. Which of the following is incorrect statement?

A. SnF_4 is ionic in nature

B. PbF_4 is covalent in natural

C. $SlCl_4$ is easiliy hydrolysed

D. $GeX_4(X = F, Cl, Br, l)$ is more stable that GeX_2

Answer: B

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21. Under isothermal condition, a gas at 300 K expands from 0.1 L to 0.25 L against a constant external pressure of 2 bar. The work done by the gas is : [Given that 1 L bar = 100 J]

A. 30 J

B. $-30J$

C. $5kJ$

D. $25J$

Answer: B

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22. The number of sigma (σ) and pi(π) bonds in pent-2-en-4-yne is:

A. 13σ bonds and no π bond

B. 10σ bonds and 3π bond

C. 8σ bonds and 5π bond

D. 11σ bonds and 2π bond

Answer: B

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23. Match the Xenon compounds Column-I with its structure in Column-II and assign the correct code :

Column-I	Column-II
$(a) XeF_4$	(i)pyramidal
$(b) XeF_6$	(ii) square planar
$(c) XeOF_4$	(iii) distored octahedral
$(d) XeO_3$	(iv) square pyramidal

A. (1) (a) (b) (c) (d) / (iii) (iv) (i) (ii)

B. (2) (a) (b) (c) (d) / (i) (ii) (iii) (iv)

C. (3) (a) (b) (c) (d) / (ii) (iii) (iv) (i)

D. (4) (a) (b) (c) (d) / (ii) (iii) (i) (iv)

Answer: C

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24. In which can change in entropy is negative

A. $2H(g) \rightarrow H_2(g)$

B. Evaporation of water

C. Expansion of a gas at constant temperature

D. sublimation of solid to gas.

Answer: A

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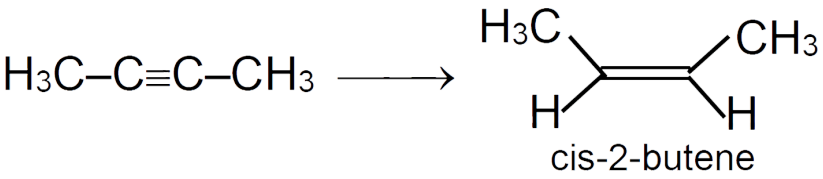
25. The most suitable reagent for the following conversion is

$H_3C - C \equiv C - CH_3 \rightarrow$



A. $Hg^{2+}/H^+, H_2O$

B. Na/liquid NH_3

C. $H_2, Pd/C$ quinoline

D. Zn/HCl

Answer: C

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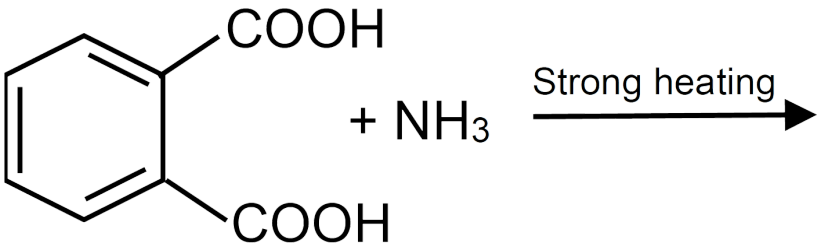
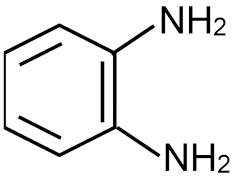
26. The major product of the following reaction is

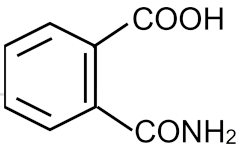


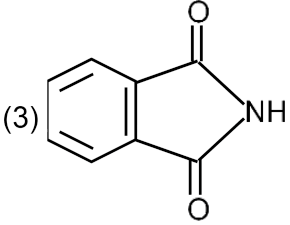
$+NH_3 \xrightarrow{\text{Strong heating}}$

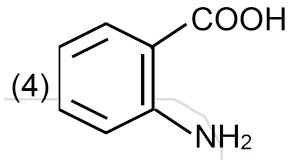
A. (1)



B. (2)



C. 

D. 

Answer: C

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27. Match the following:

(*a*)pure nitrogen	(*i*) chlorine
(*b*) Haber process	(*ii*) Sulphuric acid
(*c*) Contact process	(*iii*) Ammonia
(*d*) deacon's process	(*iv*) Sodium azide or Barium azide

A. (1) (*a*) (*iv*) (*b*) (*iii*) (*c*) (*ii*) (*d*) (i)

B. (2) (*a*) (*i*) (*b*) (*ii*) (*c*) (*iii*) (*d*) (iv)

C. (3) (*a*) (*ii*) (*b*) (*iv*) (*c*) (*i*) (*d*) (iii)

D. (4) (*a*) (*iii*) (*b*) (*iv*) (*c*) (*ii*) (*d*) (i)

Answer: A

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28. Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?

A. Brackett series

B. Lyman series

C. Balmer series

D. Paschen series

Answer: C

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29. Among the following, the narrow spectrum antibiotic is

A. Chloramphenicol

B. Penicillin G

C. Ampicillin

D. Amoxycillin

Answer: B

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30. Which mixture of the solutions will lead to the formation of negatively charged colloidal $[AgI]^-$ sol. ?

A. 50 ml of 0.1M $AgNO_3$ +50 mL of 0.1 M Kl

B. 50 mL of 1M $AgNO_3$ + 50 mL of 1.5 M Kl

C. 50 mL of 1 M $AgNO_3$+50mL of 2M Kl

D. 50 mL of 2M $AgNO_3$+ 50mL of 1.5 M Kl

Answer: B

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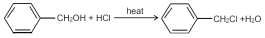
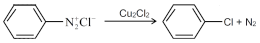
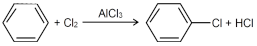
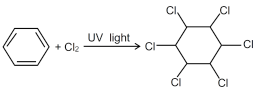
31. Among the following the reaction that produce through an electrophilic substitution is :

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: C

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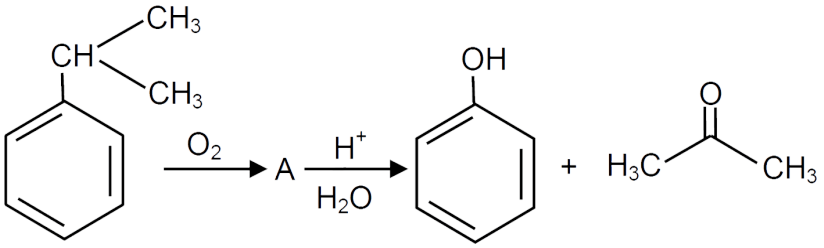
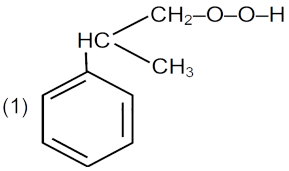
32. The structure of intemediate A in the following reaction is:

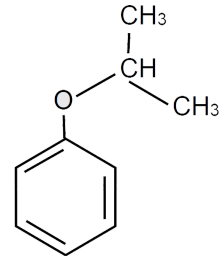


A.



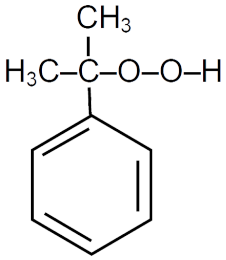
(1)

B.



(2)

C.



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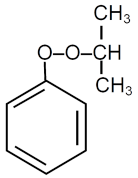
D.



(4)

Answer: C

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33. What is the correct electronic configuration of the central atom in $K_4\left[Fe(CN)_6\right]$ based on crystal field theory

A. $e^4t_2^2$

B. $t_{2g}^4e_g^2$

C. $t_{2g}^6e_g^0$

D. $e^3t_2^3$

Answer: C

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34. Among the following, the one that is not a green house gas is

A. sulphur dioxide

B. Nitrous oxide

C. methane

D. ozone

Answer: A

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35. Identify the incorrect statement related to PCl_5 from the follwing

A. PCl_5 molecule in non-reactive.

B. Three equatorial P-Cl bonds make an angle of 120° with each other

C. Two axial P-Cl bonds make an angle of 180° with each other

D. Axial P-Cl bonds

Answer: A

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36. Which one is malachite from the following

A. $CuCO_3.Cu(OH)_2$

B. $CuFeS_2$

C. $Cu(OH)_2$

D. Fe_3O_4

Answer: A

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37. Which of the following species is not stable?

A. $\left[SiCl_6\right]^{2-}$

B. $\left[SiF_6\right]^{2-}$

C. $\left[GeCl_6\right]^{2-}$

D. $\left[Sn(OH)_6\right]^{2-}$

Answer: A

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38. A compound is compound by cation C and anion A. The anions hexagonal close packed (hcp) lattice and the cations occupy 75% of octahedral voids. The formula of the compound is

A. C_4A_3

B. C_2A_3

C. C_3A_2

D. C_3A_4

Answer: D

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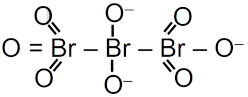
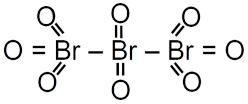
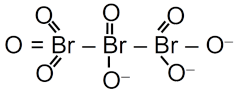
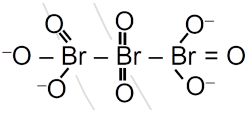
39. The correct structure of tribromootaoxide.

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: B

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40. The method used to remove temporary hardness of water is:

A. Synthetic resins method

B. Calgon's method

C. Clark's method

D. Ion-exchange method

Answer: C

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41. The non-essential amino acid among the following is

A. Lysine

B. Valine

C. Leucine

D. Alanine

Answer: D

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42. The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is :

A. 40

B. 10

C. 20

D. 30

Answer: D

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43. Which of the following reactions are disproportionation reaction ?

A. $2Cu^{+} \rightarrow Cu^{2+} + Cu^{0}$

B. $3KMnO_4^{2-} 4H^{+} \rightarrow 2MnO_4^{-} + MnO_2 + 2H_2O$

C. $2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$

D. $2MnO_4^{-} + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^{+}$

Answer: B

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44. For the chemical reaction

$N_2(g) + 3H_2(g) \Leftrightarrow 2NH_3(g)$

The correct option is:

A. $3\frac{d[H_2]}{dt} = 2\frac{d[NH_3]}{dt}$

B. $-\frac{1}{3}\frac{d[H_2]}{dt} = -\frac{1}{2}\frac{d[NH_3]}{dt}$

C. $-\frac{d[N_2]}{dt} = 2\frac{d[NH_3]}{dt}$

D. $-\frac{d[N_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$

Answer: D

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45. Conjugation base for bronsted acids H_2O and HF are:

A. H_3O^+ and H_2F^+, respectively

B. OH^- and H_2F^+, respectively

C. H_3O^+ and F^- respectively

D. OH^- and F^- respectively.

Answer: D

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46. If the concentration of OH^- ions in the reaction

$Fe(OH)_3(s) \Leftrightarrow Fe^{3+}(aq.) + 3OH^-(aq.)$

is decreased by $1/4$ times, then the equilibrium concentration of Fe^{3+} will increase by

A. 64 times

B. 4 times

C. 8 times

D. 16 times

Answer: A

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47. What volume of oxygen gas $\left(O_2\right)$ measured at $0^\circ C$ and 1 atm is needed to burn completely $1L$ of propane gas $\left(C_3H_8\right)$ measured under the same condition?

A. 5 L

B. 10 L

C. 7 L

D. 6 L

Answer: A

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48. Equal volumes of three acid solutions of $pH 3, 4$ and 5 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?

A. $3.7 \times 10^{-3} M$

B. $1.11 \times 10^{-3} M$

C. $1.11 \times 10^{-4} M$

D. $3.7 \times 10^{-4} M$

Answer: D

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49. The relative reactivities of acyl compound towards nucleophilic substitution are in the order of

A. acid anhydride gt amide gt ester gt acyl chloride

B. acyl chloride gt ester gt acid anhydride gt amide

C. acyl chloride gt acid anhydride gt ester gt amide

D. ester gt acyl chloride gt amide gt acid anhydride

Answer: C

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50. In DNA the complementary bases are

A. adenine and guanine, thymine and cytosine

B. uracil and adenine, cytosine and guanine

C. adenine and thymine, guanine and cytosine

D. adenine and thymine, guanine and uracil

Answer: C

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51. Base strength of

$(1)H_3\overset{\Theta}{C}CH_2$, $(2)H_2C=\overset{\Theta}{C}H$ and (3) $H-C\equiv\overset{\Theta}{C}$ is in the order of

A. (i) gt (iii) gt (ii)

B. (i) gt (ii) (iii)

C. (ii) gt (i) gt (iii)

D. (iii) gt (ii) gt (i)

Answer: B

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52. Equimolar solution of the following were prepared in water separately.

Which one of the solutions will record the highest pH?

A. $MgCl_2$

B. $CaCl_2$

C. $SrCl_2$

D. $BaCl_2$

Answer: D

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53. The sequence of ionic mobility in aqueous solutions is -

A. $Rb^+ > K^+ > Cs^+ > Na^+$

B. $Na^+ > K^+ > Rb^+ > Cs^+$

C. $K^+ > Na^+ > Rb^+ > Cs^+$

D. $Cs^+ > Rb^+ > K^+ > Na^+$

Answer: D

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54. If uncertainty in position and momentum are equal then uncertainty in velocity is.

A. $1/m\sqrt{(h/\pi)}$

B. $\sqrt{(h/\pi)}$

C. $1/2m\sqrt{(h/\pi)}$

D. $\sqrt{(h/2\pi)}$

Answer: C

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55. How many stereoisomerse does this molecule has?

$CH_3CH = CHCH_2CHBrCH_3$

A. 8

B. 2

C. 4

D. 6

Answer: C

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56. On the basis of the following E° values, the stongest oxidizing agent is $\left[Fe(CN)_6\right]^{4-} \rightarrow \left[Fe(CN)_6\right]^{3-} + e^-, E^\circ = -0.35V$

$Fe^{2+} \rightarrow Fe^{3+} + e^-, E^\circ = -0.77V$

A. Fe^{3+}

B. $\left[Fe(CN)_6\right]^{3-}$

C. $\left[Fe(CN)_6\right]^{4-}$

D. Fe^{2+}

Answer: B

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57. The correct of decreasing second ionisation enthalpy of $Ti(22)$, $V(23)$, $Cr(24)$ and $Mn(25)$ is

A. $Mn > Cr > Ti > V$

B. $Ti > V > Cr > Mn$

C. $Cr > Mn > V > Ti$

D. $V > Mn > Cr > Ti$

Answer: C

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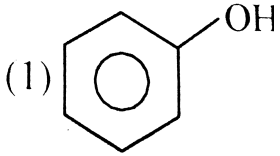
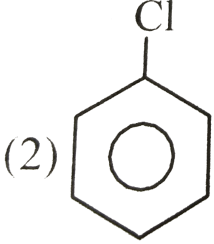
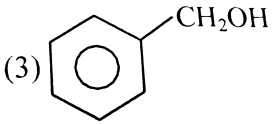
58. Which one of the following is most reactive towards electrophilic attack?

A. (1) 

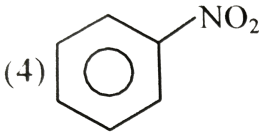
B.



C.



D.



Answer: A

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59. Four diatomic species are listed in different sequence .Which of these represent the correct order of their increasing bond order?

A. $C_2^{2-} < He_2^+ < NO < O_2^-$

B. $He_2^+ < O_2^- < NO < C_2^{2-}$

C. $O_2^- < NO < C_2^{2-} < HE_2^+$

D. $NO < C_2^{2-} < O_2^- < He_2^+$

Answer: B

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60. How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 g of HCl?

A. 0.011

B. 0.029

C. 0.044

D. 0.333

Answer: B

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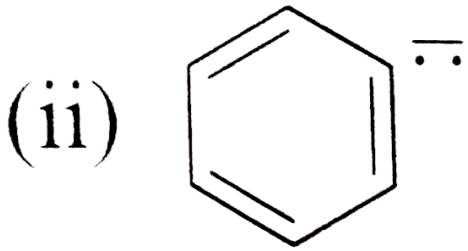
61. The stability of carbanions in the following

(i) $RC \equiv \overset{\cdot\cdot}{C}^{-}$, (ii)

(ii) 

(iii) $R_2C = \overset{\cdot\cdot}{C}H^{-}$, (iv) $R_3C\text{-}\overset{\cdot\cdot}{C}H_2^{-}$

is in the order

A. (iv) gt (ii) gt (iii) gt (i)

B. (i) gt (iii) gt (ii) gt (iv)

C. (i) gt (ii) gt (iii) gt (iv)

D. (ii) gt (iii) gt (iv) gt (i)

Answer: C

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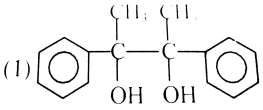
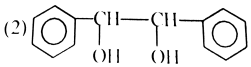
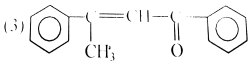
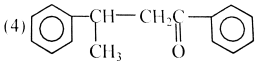
62. Acetophenone when reacted with a base, C_2H_5ONa, yields a stable compound which has the structure :

A. 

B. 

C. 

D. 

Answer: C

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63. Volume occupied by one molecule of water (density = 1 g cm^{-3})

A. $3.0 \times 10^{-23} cm^3$

B. $5.5 \times 10^{-23} cm^3$

C. $9.0 \times 10^{-23} cm^3$

D. $6.023 \times 10^{-23} cm^3$

Answer: A

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64. Bond dissociation enthalpy of H_2 , Cl_2 and HCl are $434, 242$ and $431 KJmol^{-1}$ respectively. Enthalpy of formation of HCl is

A. -93 kJ mol^{-1}

B. 245 kJ mol^{-1}

C. 93 kJ mol^{-1}

D. -245 kJ mol^{-1}

Answer: A

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65. Which of the following complexes exhibits the highest paramagnetic behaviour?

where gly=glycine, en=ethylenediamine and bipy =bipyridyl

(At. no. $Ti = 22, V = 23, Fe = 26, Co = 27$)

A. $\left[Co(OX)_2(OH)_2\right]^-$

B. $\left[Ti\left(NH_3\right)_6\right]^{3+}$

C. $\left[V(gly)_2(OH)_2\left(NH_3\right)_2\right]^+$

D. $\left[Fe(en)(\mathbf{y})\left(NH_3\right)_2\right]^{2+}$

Answer: A

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66. Which one of the following statements is not true ?

A. Buna-S is a copolymer of butadiene and styrene

B. Natural rubber is a 1, 4-polymer of isoprene

C. In vulcanization, the formation of sulphur bridges between different chains make rubber harder and stronger

D. Natural rubber has the trans-configuration at every double bond

Answer: D

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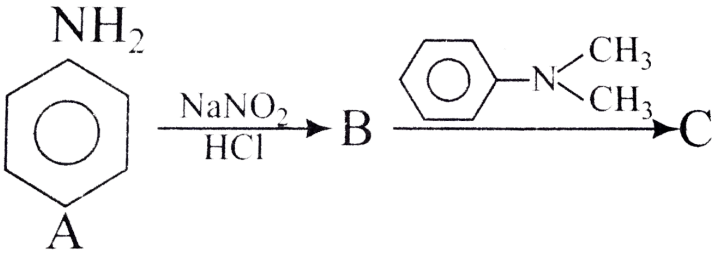
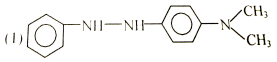
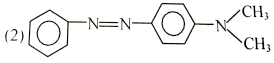
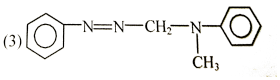
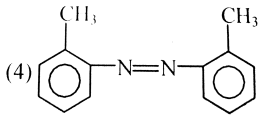
67. In a reactione a coloured product C was obtained The structure of C would be



A. 

B. 

C. 

D. 

Answer: B

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68. For the gas phase reaction

$PCl_5 \rightarrow PCl_3(g) + Cl_2(g)$

which of the following conditions are correct?

A. $\Delta H < 0$ and $\Delta S < 0$

B. $\Delta H > 0$ and $\Delta S < 0$

C. $\Delta H = 0$ and $\Delta S < 0$

D. $\Delta H > 0$ and $\Delta S > 0$

Answer: D

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69. The measurement of the electron position is associated with an uncertainty in momentum, which is equal to $1 \times 10^{-18} gcms^{-1}$. The uncertainty in electron velocity is (mass of an electron is $9 \times 10^{-28} g$)

A. $1 \times 10^{5} \text{cm s}^{-1}$

B. $1 \times 10^{11} \text{cm s}^{-1}$

C. $1 \times 10^{9} \text{cm s}^{-1}$

D. $1 \times 10^{6} \text{cm s}^{-1}$

Answer: C

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70. Angular shape of ozone molecule consists of

A. 1 sigma and 1 pi bonds

B. 2 sigma and 1 pi bonds

C. 1 sigma and 2 pi bonds

D. 2 sigma and 2 pi bonds

Answer: B

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71. Percentage of free space in cubic in a body- centred cubic unit cell is .

A. 34 %

B. 28 %

C. 30 %

D. 32 %

Answer: D

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72. the value of equilibrium constant for the reaction

$HI(g) \Leftrightarrow 1/2H_2(g) + 1/2I_2(g)$ is 8.0

The equilibrium constant for the reaction

$H_2(g) + I_2(g) \Leftrightarrow 2HI(g)$ will be

A. 16

B. 43473

C. 43481

D. 23377

Answer: D

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73. The values of K_{p_1} and K_{p_2} for the reactions

$X \Leftrightarrow Y + Z$ ....(i)

and $A \Leftrightarrow 2B$ ...(ii)

are in ratio of 9 : 1. If degree of dissociation of X and A be equal, then total presure at equilibrium (i) and (ii) are in the ratio.

A. $36:1$

B. $1:1$

C. $3:1$

D. $1:9$

Answer: A

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74. Which of the following is an amine hormone ?

A. Insulin

B. Progesterone

C. Thyroxine

D. Oxypurin

Answer: C

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75. Kohlrausch's law states that at:

A. infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte

B. infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte whatever be the nature of the other ion of the electrolyte

C. finite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte whatever be the nature of the other ion of electrolyte

D. infinite dilution each ion makes definite contribution to equivalent conductance of an electrolyte depending on the nature of the other ion of electrolyte

Answer: B

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76. Green chemistry means such reactions which

A. are related to the depletion of ozone layer

B. study the reactions in plants

C. produce colour during reactions

D. reduce the use and production of hazardous chemicals

Answer: D

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77. Which of the following statements is not correct ?

A. The number of carbon atoms in an unit cell of diamond is 4

B. The number of Bravais lattices in which a crystal can be categorized is 14

C. The fraction of the total volume occupied by the atoms in a primitive cell is 0.48

D. Molecular solids are generally volatile

Answer: C

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78. In a S_{N^2} substitution reaction of the type

$$R\text{-}Br + Cl^- \xrightarrow{\text{DMF}} R\text{-}Cl + Br^-$$

Which one of the following has the highest relative rate?

A. $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2Br$

B. CH_3CH_2Br

C. $CH_3 - CH_2 - CH_2Br$

D. $CH_3 - CH(CH_3) - CH_2Br$

Answer: B

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79. The correct order for bond angles is :

A. $NO_2^+ < NO_2 < NO_2^-$

B. $NO_2^+ < NO_2^- < NO_2$

C. $NO_2^- < NO_2^+ < NO_2$

D. $NO_2^- < NO_2 < NO_2^+$

Answer: D

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80. With Which one of the following elements silicon should be doped so as to give p-type of semiconductor?

A. Selenium

B. Boron

C. Germanium

D. Arsenic

Answer: B

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81. $H_3C - CH(CH_3) - CH = CH_2 + HBr \rightarrow A.$

A is predominantly

A. CH_3 - CH| Br - CH| CH_3 - CH_3

B. CH_3 - CH| CH_3 - CH| Br - CH_3

C. CH_3 - CH| CH_3 - CH_2 - CH_2Br

D. CH_3 - C $\begin{matrix} Br \\ | \end{matrix}$ CH_3 - CH_2CH_3

Answer: D

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82. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gave$C$, $38.71\,\%$ and H, $9.67\,\%$. The empirical formula of the compound would be :

A. CHO

B. CH_4O

C. CH_3O

D. CH_2O

Answer: C

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83. In which of the following coordination entites the magnitude of Δ_0 (CFSE in octehedral field) will be maximum.

$(At.\ No.\ Co = 27)$

A. $\left[Co(CN)_6\right]^{3-}$

B. $\left[Co\left(C_2O_4\right)_3\right]^{3-}$

C. $\left[Co\left(H_2O\right)_6\right]^{3+}$

D. $\left[Co\left(NH_3\right)_6\right]^{3+}$

Answer: A

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84. The alkali metals form salt like hydrides by the direct synthesis at elevated temperature. The termal stability of these hydrides decreases in which of the following orders ?

A. NaHgtLiHgtKHgtRbHgtCsH

B. LiHgtNaHgtKHgtRbHgtCsH

C. CsHgtRbHgtKHgtNaHgtLiH

D. KHgtNaHgtLiHgtCsHgtRbH

Answer: B

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85. Which of the following are not state functions?

(I) $q + w$

(II)q

(III) w

(IV) H - TS

A. (I), (II) and (III)

B. (II) and (III)

C. (I) and (IV)

D. (II), (III) and (IV)

Answer: B

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86. n the hydrocarbon,

$$\overset{6}{CH_3} - \overset{5}{CH} = \overset{4}{CH} - \overset{3}{CH_2} - \overset{2}{C} \equiv \overset{1}{CH}$$

The state of hybridization of carbons 1, 3 and 5 are in the following sequence :

A. sp, sp^2, sp^3

B. sp^3, sp^2, sp

C. sp^2, sp, sp^3

D. sp, sp^3, sp^2

Answer: D

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87. Number of moles of MnO_4^- required to oxidise one mole of ferrous oxalate completely in acidic medium will be

A. 7.0 mole

B. 0.2 mole

C. 0.6 mole

D. 0.4 mole

Answer: D

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88. The rate constant k_1 and k_2 for two different reactions are $10^{16}e^{-2000/T}$ and $10^{15}e^{-1000/T}$, respectively. The temperature at which

$k_1 = k_2$ is

A. 2000 K

B. $1000/2.303K$

C. 1000 K

D. $2000/2.303K$

Answer: B

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89. A strong base can abstract an α-hydrogen from

A. ketone

B. alkane

C. alkene

D. amine

Answer: A

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90. Standard free energies of formation (I kJ/mol) at $298K$ are -237.2, -394.4 and -8.2 for $H_2O(1), CO_2(g)$ and pentange (g) , respectively . The value of E°_{cell} for the pentane-oxygen fuel cell is .

A. 1.0968 V

B. 0.0968 V

C. 1.968 V

D. 2.0968 V

Answer: A

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91. If $'a'$ stands for the edge length of the cubic systems: simple cubic,body centred cubic and face centred cubic then the ratio of radii of the spheres inthese systems will be respectively,

A. $\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{2}}{2}a$

B. $1a : s\sqrt{3a} : \sqrt{2a}$

C. $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$

D. $\frac{1}{2}a : \sqrt{3}a : \frac{1}{\sqrt{2}}a$

Answer: C

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92. For vaporization of water at 1 atmospheric pressure the values of ΔH and ΔS are $40.63 KJmol^{-1}$ and $108 JK^{-1}mol^{-1}$, respectively. The temperature when Gibbs energy change (ΔG) for this transformation will be zero is

A. 393.4 K

B. 373.4 K

C. 293.4 K

D. 273.4 K

Answer: B

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93. A $0.66kg$ ball is moving wih a speed of $100m/s$. The associated wavelength will be.

A. $6.6 \times 10^{-34}m$

B. $1.0 \times 10^{-35}m$

C. $1.0 \times 10^{-32}m$

D. $6.6 \times 10^{-32}m$

Answer: B

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94. Three moles of an ideal gas expanded spontaneously into vacuum. The work done will be

A. 3 Joules

B. 9 Joules

C. Zero

D. Infinite

Answer: C

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95. The following teo reaction are known :

$Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$,

$\Delta H = -26.8kJ$

$FeO(s) + CO(g) \rightarrow Fe(s) + CO_2(g)$,

$\Delta H = -16.5kJ$

Correct target equation is

$Fe_2O_3(s) + CO(g) \rightarrow 2FeO(s) + CO_2(g), \Delta H = ?$

A. $-43.3kJ$

B. $-10.3kJ$

C. $+6.2kJ$

D. $+10.3kJ$

Answer: C

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96. The reaction,

$2A(g) + B(g) \Leftrightarrow 3C(g) + D(g)$

is begun with the concentration of A and B both at an intial value of 1.00 M. When equilibrium is reached, the concentration of D is measured and found to be 0.25 M. The value for the equilibrium constant for this reaction is given by the expression:

A. $\left[(0.75)^3(0.25)\right] \div \left[(0.50)^2(0.75)\right]$

B. $\left[(0.75)^3(0.25)\right] \div \left[(0.50)^2(0.25)\right]$

C. $\left[(0.75)^3(0.25)\right] \div \left[(0.75)^2(0.25)\right]$

D. $\left[(0.75)^3(0.25)\right] \div \left[(1.00)^2(1.00)\right]$

Answer: A

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97. The pressure exerted by $6.0g$ of methane gas in a $0.03m^3$ vessel at $129\ ^\circ C$ is: (Atomic masses of $C = 12.01, H = 1.01$ and $R = 8.314JK^{-1}mol^{-1}$)

A. 13409 Pa

B. 41648 Pa

C. 31684 Pa

D. 215216 Pa

Answer: B

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98. Which of the following expressions correctly repesents the equivalent conductance at infinte dilution of $Al_2(SO_4)_3$. Given that $\Lambda^{\circ}_{Al^{3+}}$ and $\Lambda^{\circ}_{SO_4^{2-}}$ are the equivalent conductance at infinte dilution of the respective ions?

A. $\Lambda^{\circ}_{Al^{3+}}$

B. $\left(\Lambda^{\circ}_{Al^{3+}} + \Lambda_{SO_4^{2-}}\right) \times 6$

C. $\frac{1}{3}\Lambda^{\circ}_{Al^{3+}} + \frac{1}{2}\Lambda^{\circ}_{SO_4^{2-}}$

D. $2\Lambda^{\circ}_{Al^{3+}} + 3\Lambda^{\circ}_{SO_4^{2-}}$

Answer: A

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99. How many bridging oxygen atoms are presents in P_4O_{10} ?

A. 4

B. 2

C. 5

D. 6

Answer: D

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100. Among the following which has the highest cation to anion size ratio ?

A. CsF

B. LiF

C. NaF

D. CsI

Answer: A

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101. Which of the following oxidation states is the most common among the lanthanoids ?

A. 2

B. 5

C. 3

D. 4

Answer: C

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102. Some of the properties of the two species, NO_3^- and H_3O^+ are described below.Which one of them is correct?

A. Isostructural with same hybridization for the central atom

B. Isostructural with different hybridization for the central atom

C. Similar in hybridization for the central atom with different structures

D. Dissimilar in hybridization for the central atom with different structures.

Answer: D

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103. The compound A on heating gives a colourless gas and a residue thata dissolved in water to obtain B. Excess of CO_2 is bubbled through aqueous solution of B,C is formed which is recovered in the solid form. Solid C on gentle heating gives back A. The compound is:-

A. Na_2CO_3

B. K_2CO_3

C. $CaSO_4.2H_2O$

D. $CaCO_3$

Answer: D

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104. Among the following Ca ,Mg, P and CI the order of increasing atomic radius is

A. $Cl < P < Mg < Ca$

B. $P < Cl < Ca < Mg$

C. $Ca < Mg < P < Cl$

D. $Mg < Ca < Cl < P$

Answer: A

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105. Which one of the following complex is not expected to exhibit isomerism

A. $\left[Pt\left(NH_3\right)_2Cl_2\right]$

B. $\left[Ni\left(NH_3\right)_2Cl_2\right]$

C. $\left[Ni(en)_3\right]^{2+}$

D. $\left[Ni\left(NH_3\right)_4\left(H_2O\right)_2\right]^{2+}$

Answer: B

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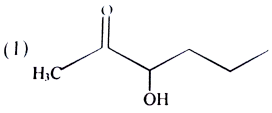
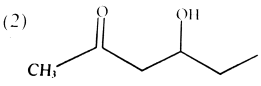
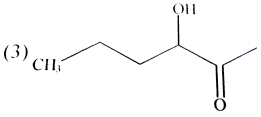
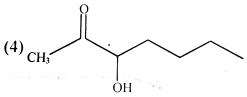
106. Which one of the following compounds will be most readily dehydrated?

A. 

B. 

C. 

D. 

Answer: B

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107. Among the following four compounds

(a) Phenol

(b) methyl phenol

(c) metanitrophenol

(d) paranitrophenol

the acidity order is –

A. $c > d > a > b$

B. $a > d > c > b$

C. $b > a > c > d$

D. $d > c > a > b$

Answer: D

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108. Fructose reduces Tollens' reagent due to :

A. primary alcoholic group

B. secondary alcoholic group

C. enolisation of fructose followed by conversion to aldehyde by base

D. asymmetric carbons

Answer: C

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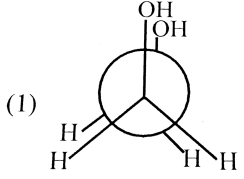
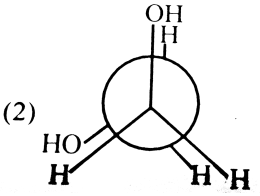
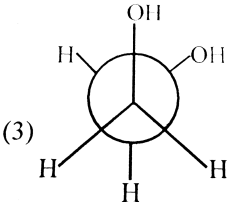
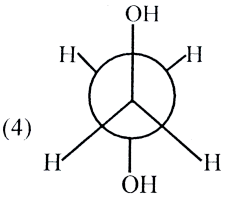
109. Which of the following conformers for ethylene glycol is most stable?

A. 

B. 

C. 

D. 

Answer: C

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110. The *IUPAC* name of the compound $CH_3CH = CHC \equiv CH$ is

A. Pent - 3 - en - 1 - yne

B. Pent - 2 - en - 4 - yne

C. Pent - 1 - yn - 3 - ene

D. Pent - 4 - yn - 2 – ene

Answer: A

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111. Glycerol on being heated with an excess of HI produces

A. allyl iodide

B. propene

C. glycerol triiodide

D. 2-iodopropane

Answer: D

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112. Which of the following species is not electrphilic in nature?

A. BH_3

B. $H_3\overset{\oplus}{O}$

C. $\overset{\oplus}{N}O_2$

D. $\overset{\oplus}{C}l$

Answer: B

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113. In the following reaction , $C_6H_5CH_2Br \xrightarrow[2.H_3O^+]{1.Mg,Ether} X$,

the product $'X'$ is

A. $C_6H_5CH_2OH$

B. $C_6H_5CH_3$

C. $C_6H_5CH_2CH_2C_6H_5$

D. $C_6H_5CH_2OCH_2C_6H_5$

Answer: B

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114. In which of the following molecules the central atom does not have sp^3 hybridization ?

A. SF_4

B. BF_4^-

C. NH_4^+

D. CH_4

Answer: A

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115. The rate of the reaction

$2NO + CI_2 \rightarrow 2NOCI$

is given by the rate equation

$Rate = k[NO]^2\left[CI_2\right]$

The value of the rate constant can be increased by

A. increasing the concentration of NO.

B. increasing the concentration of the Cl_2

C. increasing the temperature

D. doing all of these

Answer: C

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116. Match List I (Equations) with List II (Type of processes) and select the correct option.

List I (Equations)	List II (Type of processes)
A. $K_p > Q$	1. Non-spontaneous
B. $\Delta G° < RT\ln Q$	2. Equilibrium
C. $K_p = Q$	3. Spontaneous and endothermic
D. $T > \frac{\Delta H}{\Delta S}$	4. Spontaneous

A. (a) (b) (c) (d)
(iii) (iv) (ii) (i)

B. (a) (b) (c) (d)
(iv) (i) (ii) (iii)

C. (a) (b) (c) (d)
(ii) (i) (iv) (iii)

D. (a) (b) (c) (d)
(i) (ii) (iii) (iv)

Answer: B

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117. Match List -I (substances) with List -II (processes) employed in the manufacture of the substances and select the correct option.

	List -I Substances		List -II Processes
(*a*)	Sulphuric acid	(*i*)	Haber's Process
(*b*)	Steel	(*ii*)	Bessemer's Process
(*c*)	Sodium hydroxide	(*iii*)	Leblanc Process
(*d*)	Ammonia	(*iv*)	contact Process

A. (a) (b) (c) (d)
(i) (ii) (iii) (iv)

B. (a) (b) (c) (d)
(iv) (iii) (ii) (i)

C. (a) (b) (c) (d)
(iv) (ii) (iii) (i)

D. (a) (b) (c) (d)
(i) (iv) (ii) (iii)

Answer: C

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118. Match the compounds given in List -I with their characteristic reactions given in List -II. Select the correct option.

List -I Compounds		List -II Reactions	
(*a*)	$CH_3CH_2CH_2CH_2NH_2$	(*i*)	alkaline hydroloysis
(*b*)	$CH_3C \equiv CH$	(*ii*)	with KOH (alcohol) and $CHCl_3$ produces bad
(*c*)	$CH_3CH_2COOCH_3$	(*iii*)	given white ppt. with ammonical $AgNO_3$
(*d*)	$CH_3CH(OH)CH_3$	(*iv*)	with Lucas reagent clodiness appears after 5 m

A. (a) (b) (c) (d)
(iii) (ii) (i) (iv)

B. (a) (b) (c) (d)
(ii) (iii) (i) (iv)

C. (a) (b) (c) (d)
(iv) (ii) (iii) (i)

D. (a) (b) (c) (d)
(ii) (i) (iv) (iii)

Answer: B

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119. Some statements about heavy water are given below :

(*i*) Heavy water is used as a moderator in nuclear reactors

(*ii*) Heavy water is more associated than ordinary water.

(*iii*) Heavy water is more effective solvent than ordinary water

Which of the above statments are correct ?

A. (a), (b) and (c)

B. (b) and (c)

C. (a) and (c)

D. (a) and (b)

Answer: D

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120. Consider the following relations for *emf* of a electrochemical cell

(i) emf of cell = (Oxidation potential of anode)-(Reduction potential of cathode)

(ii) emf of cell = (Oxidation potential of anode)+(Reduction potential of cathode)

(iii) emf of cell = (Reduction potential of anode)+(Reduction potential of cathode)

(iv) emf of cell = (Oxidation potential of anode)-(Oxidation potential of

cathode)

Which of the above realtions are correct?

A. (a) and (b)

B. (c) and (d)

C. (b) and (d)

D. (c) and (a)

Answer: C

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121. Following compounds are given

(a) CH_3CH_2OH , (b) CH_3COCH_3

(C)$CH_3CH(OH)CH_3$, (d) CH_3OH

Which of the above compound (s), on being warmed with iodine soluton and $NaOH$, will give iodoform?

A. Only (b)

B. (a), (b) and (c)

C. (a) and (b)

D. (a), (c) and (d)

Answer: B

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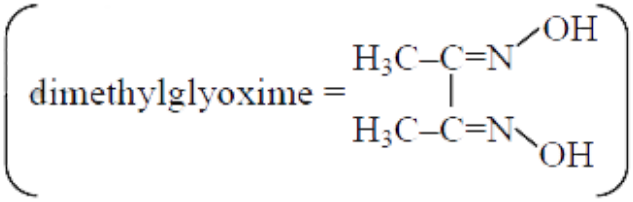
122. Red precipitate is obtained when ethanol solution of dimethylglyoxime is added to ammoniacal Ni(II). Which of the following statements is not rue ?



A. Complex has symmetrical H-bonding

B. Red complex has a tetrahedral geometry

C. Dimethylglyoxime functions as bidentate ligand

D. Red complex has a square planar geometry.

Answer: B

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123. During change of O_2 to O_2^{2-} ion, the electrons add on which of the following orbitals ?

A. π orbital

B. σ^* orbital

C. σ orbital

D. π^* orbital

Answer: D

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124. Consider the reaction

$RCHO + NH_2NH_2 \rightarrow R\text{-}CH = NNH_2$

What sort of reaction is it?

A. Free radical addition – elimination reaction

B. Electrophilic substitution-elimination reaction

C. Nucleophilic addition – elimination reaction

D. Electrophilic addition – elimination reaction

Answer: C

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125. In which of the following arrangements the given sequence is not strict according to the property indicated against it?

A. $H_2O < H_2S < H_2Se < H_2Te$: increasing pK_a values

B. $NH_3 < PH_3 < AsH_3 < SbH_3$: increasing acidic character

C. $CO_2 < SiO_2 < SnO_2 < PbO_2$: increasing oxidiasing oxidising power

D. $HF < HCl < HBr < HI$: increasing acidic strength

Answer: A

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126. The Gibbs energy for the decomposition of Al_2O_3 at $500^\circ C$ is as follow :

$$\frac{2}{3}Al_2O_3 \rightarrow \frac{4}{3}Al + O_2, \Delta_r G = +960 kJmol^{-1}$$

The potential difference needed for the electrolytic reduction of aluminium oxide $\left(Al_2O_3\right)$ at $500^\circ C$ is

A. 3.0 V

B. 2.5 V

C. 5.0 V

D. 4.5 V

Answer: B

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127. Given that equilibrium constant for the reaction $2SO_2(g) + O_2(g) \Leftrightarrow 2SO_3(g)$ has a value of 278 at a particular temperature. What is the value of the equilibrium constant for the following reaction at the same temperature ? $SO_3(g) \Leftrightarrow SO_2(g) + \frac{1}{2}O_2(g)$

A. 3.6×10^{-3}

B. 6.0×10^{-2}

C. 1.3×10^{-5}

D. 1.8×10^{-3}

Answer: B

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128. Which of the following compounds can be used as antifreeze in automobile radiators?

A. Glycol

B. Nitrophenol

C. Ethyl alcohol

D. Methyl alcohol

Answer: A

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129. Molar conductivities $\left(\Lambda_m^\circ\right)$ at infinite dilution of $NaCl, HCl$ and CH_3COONa arc $126.4, 425.9$ and $91.0 Scm^2 mol^{-1}$ respectively. Λ_m° for CH_3COOH will be

A. $180.5\ \text{S cm}^2\ \text{mol}^{-1}$

B. $290.8\ \text{S cm}^2\ \text{mol}^{-1}$

C. $390.5\ S\ cm^2\ mol^{-1}$

D. $425.5\ S\ cm^2\ mol^{-1}$

Answer: C

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130. The vapour pressure of chloroform $(CHCl)_3$ and dichlorocethene $\left(CH_2Cl_2\right)$ at $298K$ is $200mmHg$ and $415mmHg$, respectively. Calculate

a. The vapour pressure of the solution prepared by mixing $25.5g$ of $CHCl_3$ and $40g$ of $CH_2\_Cl(2)$ at $298K$.

b. Mole fractions of each components in vapour phase .

A. 615.0 mm Hg

B. 347.9 mm Hg

C. 285.5 mm Hg

D. 173.9 mm Hg

Answer: B

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131. A certain gas takes three times as long to effuse out as helium. Its molar mass will be

A. 36 u

B. 64 u

C. 9 u

D. 27 u

Answer: A

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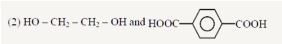
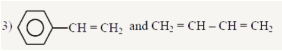
132. Which one of the following sets forms biodegradable polymer?

A. $H_2N - CH_2 - COOH$ and $H_2N - (CH_2)_5 - COOH$

B. 

C. 

D. $CH_2 = CH - CN$ and $CH_2 = CH - CH = CH_2$

Answer: A

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133. The catalytic activity of the transition metals and their compound is ascribed to:

A. their unfilled d-orbitals

B. their ability of adopt variable oxidation states

C. their chemical reactivity

D. their magnetic behaviour

Answer: B

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134. Given the reaction between 2 gases represented by A_2 and B_2 to given the compound AB(g). $A_2(g) + B_2(g) \Leftrightarrow 2AB(g)$

At equilibrium, the concentrtation

of $A_2 = 3.0 \times 10^{-3} M$

of $B_2 = 4.2 \times 10^{-3} M$

of $AB = 2.8 \times 10^{-3} M$

If the reaction takes place in a sealed vessel at $527^\circ C$. then the value of K_c will be

A. 1.9

B. 0.62

C. 4.5

D. 2.0

Answer: B

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135. Standard reduction potentails of the half reactions are given below:

$F_2(g) + 2e^- \rightarrow 2F^-(aq.),, E^\ominus = +2.87$

$Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq.),, E^\ominus = +1.36V$

$Br_2(g) + 2e^- \rightarrow 2Br^-(aq.),, E^\ominus = +1.09V$

$I_2(s) + 2e^- \rightarrow 2l^-(aq.),, E^\ominus = +0.54V$

The strongest oxidizing and reducing agents respectively are:

A. Br_2 and Cl^-

B. Cl_2 and Br^-

C. Cl_2 and I_2

D. Cl_2 and I_2

Answer: D

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136. Four diatomic species are listed in different sequence .Which of these represent the correct order of their increasing bond order?

A. $O_2^- < NO < C_2^{2-} < He_2^+$

B. $C_2^{2-} < He_2^+ < O_2^- < NO$

C. $He_2^+ < O_2^- < NO < C_2^{2-}$

D. $NO < O_2^- < C_2^{2-} < He_2^+$

Answer: C

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137. Low spin complex of d^6-cation in an octahedral field will have the following energy:

A. $\frac{-12}{5}\Delta_0 + 3P$

B. $\frac{-2}{5}\Delta_0 + 2P$

C. $\frac{-2}{5}\Delta_0 + P$

D. $\frac{-12}{5}\Delta_0 + P$

Answer: A

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138. Which of the following compounds will give a yellow precipitate with iodine alkali?

A. Methyl acetate

B. Acetamide

C. 2-Hydroxypropane

D. Acetophenone

Answer: C

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139. The orbital angular momentum of a p-electron is given as :

A. $\sqrt{3}\frac{h}{2\pi}$

B. $\sqrt{\frac{3}{2}}\frac{h}{\pi}$

C. $\sqrt{6}.\sqrt{\frac{h}{2\pi}}$

D. $\frac{h}{\sqrt{2}\pi}$

Answer: D

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140. Which one of the following does not correctly represent the correct order of the property indicated against it

A. $Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$: increasing magnetic moment

B. $Ti < V < Cr < Mn$: increasing melting point

C. $Ti < V < Mn < Cr$: increasing 2^{nd} ionisation enthalpy

D. $Ti < V < Cr < Mn$: increasing number of oxidation states

Answer: B

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141. Chloramphenicol is an :

A. antihistaminic

B. antiseptic and disinfectant

C. antibiotic-broad spectrum

D. antifertility drug

Answer: C

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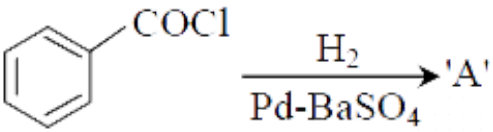
142. Consider the following reaction :



The product 'A' is -

A. C_6H_5OH

B. $C_6H_5COCH_3$

C. C_6H_5Cl

D. C_6H_5CHO

Answer: D

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143. Which of the following reagents will be able to distinguish between

1 - butyne and 2 - butyne ?

A. HCl

B. O_2

C. Br_2

D. $NaNH_2$

Answer: D

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144. For real gases, van der Waals' equation is written as

$$\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$$

where a and b are van der Waals' constants.

Two sets of gases are:

$(I) O_2, CO_2, H_2$ and $He (II) CH_4, O_2$ and O_2 and H_2

The gases given in set I in increasing order of b and gases given in set II in decreasing order of a are arranged below. Select the correct order from the following:

A. $(I)O_2 < He < H_2 < CO_2(II)H_2 > O_2 > CH_4$

B. $(I)H_2 < He < O_2 < CO_2(II)CH_4 > O_2 > H_2$

C. $(I)H_2 < O_2 < He < CO_2(II)O_2 > CH_4 > H_2$

D. $(I)He < H_2 < CO_2 < O_2(II)CH_4 > H_2 > O_2$

Answer: B

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145. Activation energy $\left(E_a\right)$ and rate constants (k_1 and k_2) of a chemical reaction at two different temperatures (T_1 and T_2) are related by

A. $\ln. \frac{k_2}{k_1} = -\frac{E_a}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$

B. $\ln. \frac{k_2}{k_1} = -\frac{E_a}{R}\left(\frac{1}{T_2} + \frac{1}{T_1}\right)$

C. $\ln. \frac{k_2}{k_1} = \frac{E_a}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

D. $\ln. \frac{k_2}{k_2} = -\frac{E_a}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

Answer: A::C

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146. Which of the following exhibits only +3 oxidation state?

A. Th

B. Ac

C. Pa

D. U

Answer: B

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147. Equal volumes of two monoatomic gases, A, B, at the same temperature and pressure are mixed. The ratio of specific heats $\left(C_p / C_v\right)$ of the mixture will be

A. 1.50

B. 3.3

C. 1.67

D. 0.83

Answer: C

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148. Structure of a mixed oxide is cubic closed - packed (ccp) .The cubic unit cell of mixed oxide is composed of oxide ions .One fourth of the tetrahedral voids are occupied by divalent metal A and the octahedral voids are occupied by a monovelent metal B .The formula of the oxide is

A. A_2BO_2

B. $A_2B_3O_4$

C. AB_2O_2

D. ABO_2

Answer: C

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149. Four successive members of the first series of transition metals are listed below. For which one of the of standard potential $\left(E^{\circ}_{M^{2+}/M}\right)$ value has a positive sign ?

A. $Ni(Z = 28)$

B. $Cu(Z = 29)$

C. $Fe(Z = 26)$

D. $Co(Z = 27)$

Answer: B

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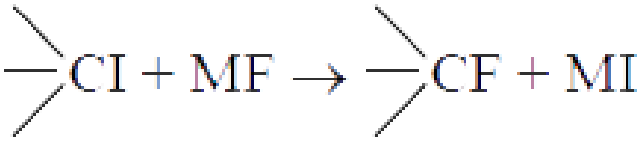
150. In the replacement reaction



The reaction will be most favourable if M happens to be -

A. K

B. Rb

C. Li

D. Na

Answer: B

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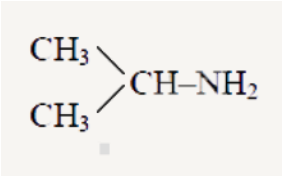
151. An organic compound $\left(C_3H_9N\right)$ (A) when treated with nitrous acid , gave an alcohol and N_2 gas was evolved. (A) on warming with $CHCl_3$ and

caustiv potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of (A).

A. $CH_3CH_2 - NH_CH_3$

B. $CH_3 - N| \ CH_3 - CH_3$

C. $CH_3CH_2CH_2 - NH_2$

D. 

Answer: D

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QUESTION

1. The correct order of N-compounds in its decreasing order of oxidation states is

A. HNO_3, NH_4Cl, NO, N_2

B. HNO_3, NO, NH_4Cl, N_2

C. HNO_3, NO, N_2, NH_4Cl

D. NH_4Cl, N_2, NO, HNO_3

Answer: C

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2. Which one of following elements is unable to from MF_6^{3-} ion?

A. B

B. Al

C. Ga

D. In

Answer: A

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3. Considering Ellingham diagram, which of the following metals can be used to reduce alumina?

A. Mg

B. Zn

C. Fe

D. Cu

Answer: A

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4. The increasing order of atomic radii of the following group 13 elements is

A. $B < Ga < Al < Tl < In$

B. $B < Al < Ga < In < Tl$

C. $B < Al < In < Ga < Tl$

D. $B < Ga < Al < In < Tl$

Answer: D

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5. Which of the following is not true for halogens ?

A. All but fluorine show positive oxidation states

B. All are oxidising agents

C. All form monobasic oxyacids

D. Chlorine has the highest electron-gain enthalpy

Answer: A

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6. In the structure of ClF_3, the number of lone pairs of electrons on central atom 'Cl' is

A. four

B. two

C. one

D. three

Answer: B

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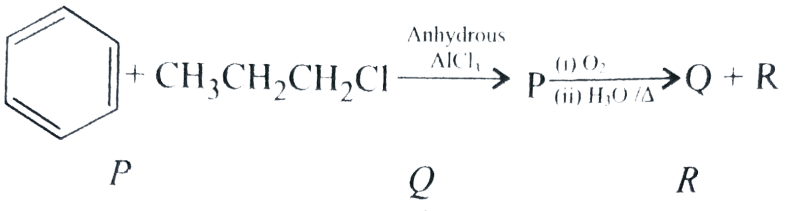
7. Identify the major product P, Q and R in the following sequence of reactions:



P Q R

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8. Which of the following compounds can form a Zwitter ion ?

A. Benzoic acid

B. Acetanilide

C. Aniline

D. Glycine

Answer: D

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9. Regarding cross-linked or network polymers, which of the following statements is incorrect?

A. Examples are bakelite and melamine

B. They are formed from bi-and tri-functional monomers

C. They contain covalent bonds between various linear polymer chains

D. They contain strong covalent bonds in their polymer chains

Answer: D

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10. Nitration of aniline in strong acidic medium also gives m-nitroaniline because

A. in absence of substituents nitro group always goes to m-position

B. in electrophilic substitution reactions amino group is meta directive

C. in spite of substituents nitro group always goes to only m-position

D. in acidic (strong) medium aniline is present as anilinium ion

Answer: D

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11. The difference between amylose and amylopectin is

A. amylopectin have $1 \rightarrow 4\alpha$-linkage and $1 \rightarrow 6\beta$-linkage

B. amylose have $1 \rightarrow 4\alpha$-linkage and $1 \rightarrow 6\beta$-linkage

C. amylopectin have $1 \rightarrow 4\alpha$-linkage and $1 \rightarrow 6\alpha$-linkage

D. amylose is made up of glucose and galactose

Answer: C

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12. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

A. 2.8

B. 3.0

C. 1.4

D. 4.4

Answer: A

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13. Which of the following oxides is most acidic in nature ?

A. BaO

B. BeO

C. MgO

D. CaO

Answer: B

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14. Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity?

A. N_2O

B. NO_2

C. N_2O_5

D. NO

Answer: C

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15. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give di Ethyl ether. A, B and C are in the order

A. $C_2H_5Cl, C_2H_6, C_2H_5OH$

B. $C_2H_5OH, C_2H_5Cl, C_2H_5Ona$

C. $C_2H_5OH, C_2H_6, C_2H_5Cl$

D. $C_2H_5OH, C_2H_5Ona, C_2H_5Cl$

Answer: D

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16. The compound C_7H_8 undergoes the following reactions :

$$C_7H_8 \xrightarrow{3Cl_2/\Delta} A \xrightarrow{Br_2/Fe} B \xrightarrow{Zn/HCl} C$$

The product 'C' is

A. 3-bromo-2,4,6-trichlorotoluene

B. o-bromotoluene

C. m-bromotoluene

D. p-bromotoluene

Answer: C

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17. Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms. A is

A. CH_3 - CH_3

B. $CH_2 = CH_2$

C. $CH \equiv CH$

D. CH_4

Answer: D

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18. Which of the following molecules represents the order of hybridisation `sp^(2),sp^(3),sp from left to right atoms ?

A. $CH_2 = CH - CH = CH_2$

B. $CH_2 = CH - C \equiv CH$

C. $CH \equiv C - C \equiv CH$

D. $CH_3 - CH = CH - CH_3$

Answer: B

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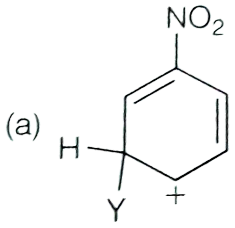
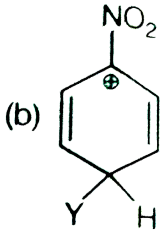
19. Which of the following carbocations is expected to be most stable ?

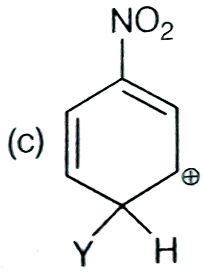
A.



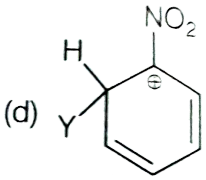
B.



C.



D.



Answer: A

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20. Which of the following is correct with respect to $-I$ effect of the substitutes? $(R = alkyl)$

A. $-NH_2 > -OR > F$

B. $-NR_2 < -OR < -F$

C. $-NH_2 < -OR < -F$

D. $-NH_2 > -OR > -F$

Answer: B::C

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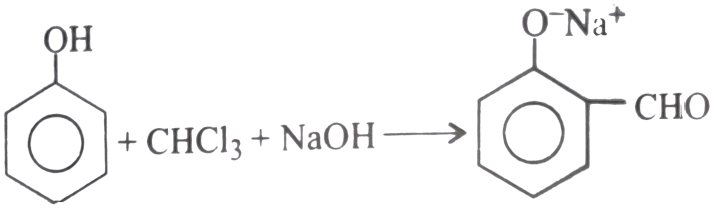
21. In the reaction



the electrophile involved is

A. dichloromethyl anion $\left(\bar{C}HCl_2\right)$

B. formyl cation $\left(\overset{+}{C}HO\right)$

C. dichloromethyl cation $\left(\overset{+}{C}HCl_2\right)$

D. dichlorocarbene $\left(:CCl_2\right)$

Answer: D

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22. Carboxylic acid have higher boiling points than aldehydes, ketones and even alcohol of comparable molecular mass. It is due to their

A. more extensive association of carboxylic acid via van der Waals' force of attraction

B. formation of carboxylate ion

C. formation of intramolecular H-bonding

D. formation of intermolecular H-bonding

Answer: D

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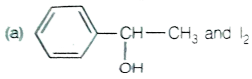
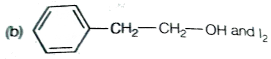
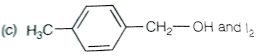
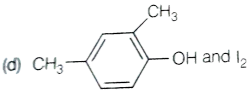
23. Compound $A, C_8H_{10}O$, is found to react with $NaOI$ (produced by reacting Y with $NaOH$) and yields a yellow precipitate with characteristic smell.

A and Y are respectively

A. 

B. 

C. 

D. 

Answer: A

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24. Match the metal ions given in Column I with the spin magnetic moments of the ions given in Column II and assign the correct code :

	Column I		Column II
1.	Co^{3+}	i.	$\sqrt{8}$ BM
2.	Cr^{3+}	ii.	$\sqrt{35}$ BM
3.	Fe^{3+}	iii.	$\sqrt{3}$ BM
4.	Ni^{2+}	iv.	$\sqrt{24}$ BM
		v.	$\sqrt{15}$ BM

A.
1	2	3	4
iv	*I*	*ii*	*iii*

B.
1	2	3	4
I	*ii*	*iii*	*iv*

C.
1	2	3	4
iv	*v*	*ii*	*i*

D.
1	2	3	4
iii	*v*	*I*	*ii*

Answer: C

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25. Which one of the following ions exhibits d-d transition and paramagnetism as well ?

A. MnO_4^-

B. $Cr_2O_7^{2-}$

C. CrO_4^{2-}

D. MnO_4^{2-}

Answer: D

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26. Iron carbonyl, $Fe(CO)_5$ is

A. trinuclear

B. mononuclear

C. tetranuclear

D. dinuclear

Answer: B

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27. The type of isomerism shown by the complex $\left[COCl_2(en)_2\right]$ is

A. ionisation isomerism

B. coordination isomerism

C. geometrical isomerism

D. linkage isomerism

Answer: C

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28. The geometry and magnetic behaviour of the complex $\left[Ni(CO)_4\right]$ are

A. square planar geometry and paramagnetic

B. tetrahedral geometry and diamagnetic

C. square planar geometry and diamagnetic

D. tetrahedral geometry and paramagnetic

Answer: B

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29. Following solutions were prepared by mixing different volumes of NaOH and HCl of different concentrations:

a. 60 mL $\frac{M}{10}HCl + 40mL\frac{M}{10}$ NaOH

b. 55 mL $\frac{M}{10}HCl + 45mL\frac{M}{10}$ NaOH

c.75 mL $\frac{M}{5}HCl + 25mL\frac{M}{5}$ NaOH

d. 100 mL $\frac{M}{10}HCl + 100mL\frac{M}{10}$ NaOH

pH of which one of them will be equal to 1 ?

A. IV

B. I

C. II

D. III

Answer: D

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30. On which of the following properties does the coagulating power of an ion depend?

A. Both magnitude and sign of the charge on the ion

B. Size of the ion alone

C. The magnitude of the charge on the ion alone

D. The sign of charge on the ion alone

Answer: A

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31. Given van der Waals constant for NH_3, H_2, O_2 and CO_2 are respectively $4.17, 0.244, 1.36$ and 3.59, which one of the following gases is most easily liquefied?

A. O_2

B. H_2

C. NH_3

D. CO_2

Answer: C

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32. The solubility of $BaSO_4$ in water is $2.42 \times 10^{-3} gL^{-1}$ at $298K$. The value of its solubility product $\left(K_{sp}\right)$ will be (Given molar mass of $BaSO_4 = 233 gmol^{-1}$)

A. $1.08 \times 10^{-14}\ \text{mol}^2 L^{-2}$

B. $1.08 \times 10^{-12}\ \text{mol}^2 L^2$

C. $1.08 \times 10^{-10}\ \text{mol}^2 L^{-2}$

D. $1.08 \times 10^{-8}\ \text{mol}^2 L^{-2}$

Answer: C

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33. In which case is the number of molecules of water maximum?

A. 0.00224 L of water vapours at 1 atm and 273 K

B. 0.18 g of water

C. 18 mL of water

D. 10^{-3} mol of water

Answer: C

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34. The correct difference between first and second order reactions is that

A. a first-order reaction can be catalysed , a second-order reaction cannot be catalysed

B. the half-life of a first-order reaction does not depend on $[A]_0$, the half-life of a second-order reaction does depend on $[A]_0$

C. the rate of a first-order reaction does not depend on reactant concentrations, the rate of a second-order reaction does depend on reactant concentrations

D. the rate of a first-order reaction does depend on reactant concentrations, the rate of a second-order reaction does not depend on reactant concentrations

Answer: B

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35. Among $CaH_2, BeH_2, BaH_2,$ the order of ionic character is

A. $BeH_2 < BaH_2 < CaH_2$

B. $CaH_2 < BeH_2 < BaH_2$

C. $BeH_2 < CaH_2 < BaH_2$

D. $BaH_2 < BeH_2 \leq CaH_2$

Answer: C

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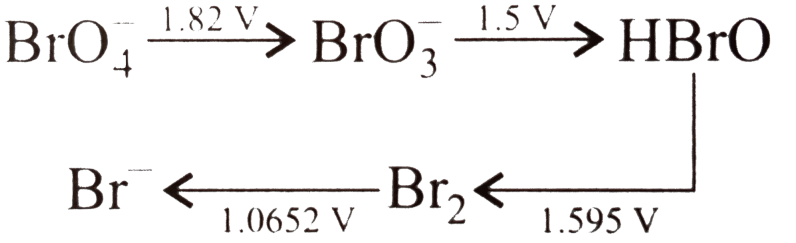
36. Consider the change in oxidation state of Bromine corredponding to different emf values as shown in the diagram below :



The the species undergoing dispropprtionation is .

A. Br_2

B. BrO_4^-

C. BrO_3^-

D. $HBrO$

Answer: D

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37. For the redox reaction,

$$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$$

the correct coefficients of the reactants for the balanced reaction are

A.

MnO_4^-	$C_2O_4^{2-}$	H^+
2	16	5

B.

MnO_4^-	$C_2O_4^{2-}$	H^+
2	5	16

C.

MnO_4^-	$C_2O_4^{2-}$	H^+
16	5	2

D.

MnO_4^-	$C_2O_4^{2-}$	H^+
5	16	2

Answer: B

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38. Which one of the following condition will favour maximum formation of the product in the reaction. $A_2(g) + B_2(g) \Leftrightarrow X_2(g)\Delta_r H = -X$ kJ ?

A. High temperature and high pressure

B. Low temperature and low pressure

C. Low temperature and high pressure

D. High temperature and low pressure

Answer: C

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39. When initial concentration of the reactant is doubled, the half-life period of a zero order reaction

A. is tripled

B. is doubled

C. is halved

D. remains unchanged

Answer: B

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40. If the bond dissociation energies of XY, X_2 and Y_2 are in the ratio of $1:1:0.5$ and ΔH_f for the formation of Xy is $-200 KJ/mol$. The bond dissociation energy of X_2 will be : -

A. $800\ \text{kJ mol}^{-1}$

B. $100\ \text{kJ mol}^{-1}$

C. $200\ \text{kJ mol}^{-1}$

D. $400\ \text{kJ mol}^{-1}$

Answer: A

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41. The correction factor 'a' to the ideal gas equation corresponds to

A. electric field present between the gas molecules volume of the gas molecules

B. density of the gas molecules

C. density of the gas molecules

D. forces of attraction between the gas molecules

Answer: D

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42. Consider the following species

CN^-, CN^-, NO and CN`.

Which one of these will hqave the highest bond order ?

A. CN^+

B. CN^-

C. NO

D. CN

Answer: B

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43. Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2, 2s^2 2p^3$, the simplest formula for this compound is

A. Mg_2X

B. MgX_2

C. Mg_2X_3

D. Mg_3X_2

Answer: D

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44. Iron exhibits b structure at roomj temperature. Above $9000^\circ C$, it transformers to f structure. The ratio of density of iron at room temperature to that at $900^\circ C$ (assuming molar mass and atomic radius of iron remains constant with temperature) is

A. $\frac{3\sqrt{3}}{4\sqrt{2}}$

B. $\frac{4\sqrt{3}}{3\sqrt{2}}$

C. $\frac{\sqrt{3}}{\sqrt{2}}$

D. $\frac{1}{2}$

Answer: A

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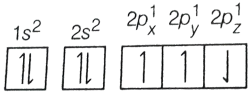
45. Which one is a wrong statement ?

A. The electronic configuration of N-atom is



B. An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers

C. Total orbital angular momentum of electron in 's' orbital is equal to zero

D. The value of m for d_{z^2} is zero

Answer: A

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46. For the reaction $N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2$, the rate of disappearance of N_2O_5 is $6.25 \times 10^{-3} \text{mol L}^{-1}\text{s}^{-1}$. The rate of formation of NO_2 and O_2 will be respectively.

A. $6.25 \times 10^{-3} molL^{-1}S^{-1}$ and $6.25 \times 10^{-3} molL^{-1}S^{-1}$

B. $1.25 \times 10^{-3} molL^{-1}S^{-1}$ and $3.125 \times 10^{-3} molL^{-1}S^{-1}$and

C. $6.25 \times 10^{-3} molL^{-1}S^{-1}$ and $3.125 \times 10^{-3} molL^{-1}S^{-1}$and

D. $1.25 \times 10^{-3} molL^{-1}S^{-1}$ and $6.25 \times 10^{-3} molL^{-1}S^{-1}$and

Answer: B

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47. Liquid hydrocarbon can be converted to a mixture of gaswous hydrocarbon by

A. Oxidation

B. Cracking

C. Distillation under reduced pressure

D. Hydrolysis

Answer: B

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48. In which of the following pairs of molecule/ions , the central atom has sp^2 hybridization?

A. NO_2^- and NH_3

B. BF_3 and NO_2

C. NH_2 and H_2O

D. $BF_3$and NH_(2)`

Answer: B

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49. Which one of the following does not exhibit the phenomenon of mutarotation ?

A. (+) Sucrose

B. (+) Lactose

C. (+) Maltose

D. (–) Fructose

Answer: A

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50. Which of the following species does not exist under normal condition ?

A. Be_2^+

B. Be_2

C. B_2

D. Li_2

Answer: B

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51. Which of the following complex ion is not expected to absorb visible light?

A. $\left[Ni(CN)_4\right]^{2-}$

B. $\left[Cr\left(NH_3\right)_6\right]^{3+}$

C. $\left[Fe\left(H_2O\right)_6\right]^{3+}$

D. $\left[Ni\left(H_2o\right)_6\right]^{2+}$

Answer: A

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52. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6 - trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be:

A. III gt II gt IV gt I

B. II gt III gt I gt IV

C.) II gt III gt IV gt I

D. III gt IV gt II gt I

Answer: A

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53. pH of saturated solution of $Ba(OH)_2$ is 12. The value of solubility product $\left(K_{sp}\right)$ of $Ba(OH)_2$ is

A. $4.00 \times 10^{-6} m^3$

B. $4.00 \times 10^{-7} M^3$

C. $5.00 \times 10^{-6} M^3$

D. $5.00 \times 10^{-7} M^3$

Answer: D

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54. The raction of toluene with CI_2 in presence of $FeCI_3$ gives X and reaction in presence of light gives Y Thus X and Y are .

A. X = Benzal chloride,

Y = o-chlorotoluene

B. X = m– chlorotoluene,

Y = p- chlorotoluene

C. X = o-and p- chlorotoluene

Y = Trichloromethyl benzene

D. X = Benzyl chloride,

Y = m- chlorotoluene

Answer: C

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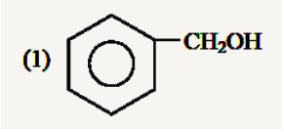
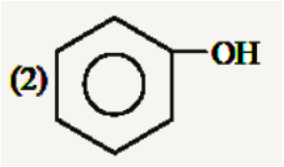
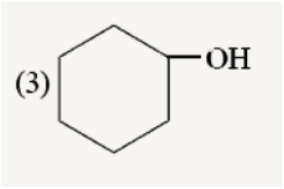
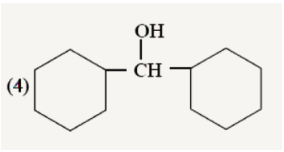
55. Which one of the following compounds has the most acidic nature?

A. 

B. 

C. 

D. 

Answer: B

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56. What is $\left[H^{+}\right]$ in mol/L of a solution that is $0.20M$ in CH_3COONa and $0.1M$ in CH_3COOH? K_a for CH_3COOH is 1.8×10^{-5}?

A. 3.5×10^{-4}

B. 1.1×10^{-5}

C. 1.8×10^{-5}

D. 9.0×10^{-6}

Answer: D

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57. For an endothermic reaction energy of activation is E_a and enthlpy of reaction is ΔH (both in $kJ\text{mol}^{-1}$). Minimum value of E_a will be

A. less than ΔH

B. equal to ΔH

C. more than ΔH

D. equal to zero

Answer: C

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58. For the reduction of silver ions with copper metal, the standard cell potential was foound to be $+0.46V$ at $25\,^{\circ}C$. The value of standard Gibbs energy, ΔG° will be $\left(F = 96,500 Cmol^{-1}\right)$:

A. –89.0 kJ

B. –89.0 J

C. –44.5 kJ

D. –98.0 kJ

Answer: A

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59. In which of the following equilibriumK_c andK_p are not equal?

A. $2NO_{(g)} \Leftrightarrow N_{2(g)} - O_2(g)$

B. $SO_{2(g)} + NO_{2(g)} \Leftrightarrow SO_{3(g)} + NO((g))$

C. $H_{2(g)} + I_{2(g)} HArr 2HI_{(g)}$

D. $2C_{(s)} + O_{2(g)} \Leftrightarrow 2CO_{2(g)}$

Answer: D

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60. Which of the following ions will exhibit colour in aqueous solution ?

A. $La^{3+}(z = 57)$

B. $Ti^{3+}(z = 22)$

C. $LU^{3+}(z = 71)$

D. $Sc^{3+}(z = 21)$

Answer: B

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61. Acetamide is treated separately with the following reagents. Which one of these would give methyl amine ?

A. $NaOH$ - Br_2

B. Sodalime

C. Hot conc.H_2SO_4

D. PCl_5

Answer: A

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62. An aqueous solution is 1.00 molal in KI. Which change will cause the vapor pressure of the solution to increase?

A. addition of NaCl

B. addition ofNa_2SO_4

C. addition of 1.00 molal KI

D. addition of water

Answer: D

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63. A solution of sucrose (molar mass $= 342 \text{g mol}^{-1}$) has been prepared by dissolving 68.5g of sucrose in 1000g of water. The freezing point of the solution obtained will be :

(K_f for water $= 1.86 \text{K kg mol}^{-1}$)

A. –0.372°C

B. –0.520°C

C. + 0.372°C

D. – 0.570°C

Answer: A

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64. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy?

A. $CaSO_4$

B. $BeSO_4$

C. $BaSO_4$

D. $SrSO_4$

Answer: B

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65. Which one of the following ions has electronic configuration $[Ar]3d^6$? $(At.\ Nos.\ Mn = 25, Fe = 26, Co = 27, Ni = 28)$

A. Ni^{3+}

B. Mn^{3+}

C. Fe^{3+}

D. Co^{3+}

Answer: D

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66. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to:

A. increase in ionic mobility of ions

B. 100% ionization of electrolyte at normal dilution

C. increase in both i.e. number of ions and ionic mobility of ions

D. increase in number of ions

Answer: A

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67. Crystal field stabilization energy for high spin d^4 octahedral complex is

A. $-1.8\Delta_0$

B. $-1.6\Delta_0 + P$

C. $-1.2\Delta_0$

D. $-0.6\Delta_0$

Answer: D

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68. Oxidation state of P in $H_4P_2O_5$, $H_4P_2O_6$, $H_4P_2O_7$ are respectively

A. +3, +5, + 4

B. +5, +3, +4

C. +5, +4, +3

D. +3, +4, +5

Answer: D

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69. Which of the following statements about primary amines is false ? .

A. Alkyl amines are stronger bases than aryl amines

B. Alkyl amines react with nitrous acid to produce alcohols

C. Aryl amines react with nitrous acid to produce phenols

D. Alkyl amines are stronger bases than ammonia

Answer: C

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70. The correct order of increasing bond angle in the following species is

A. $Cl_2O < ClO_2 < ClO_2^-$

B. $ClO_2 < Cl_2O < ClO_2^-$

C. $Cl_2O < ClO_2^- < ClO_2$

D. $ClO_2^- < Cl_2O < ClO_2$

Answer: C

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71. Which of the following compounds is most susceptible to a nucleophilic attack at the carbonyl group?

A. CH_3COOCH_3

B. CH_3CONH_2

C. $CH_3COOCOCH_3$

D. CH_3COCl

Answer: D

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72. $25.3g$ sodium carbonate, Na_2CO_3, was dissolved in enough water to make $250mL$ of solution. If sodium carbonate dissociates completely, molar concentration of Na^+ and carbonate ions are respectively:

A. 0.955 M and 1.910 M

B. 1.910 M and 0.955 M

C. 1.90 M and 1.910 M

D. 0.477 and 0.477 M

Answer: B

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73. In a buffer solution containing equal concentration of B^- and HB, the K_b for B^- is 10^{-10}. The pH of buffer solution is

A. 10

B. 7

C. 6

D. 4

Answer: D

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74. The existence of two different colored complexes with the composition of $\left[Co\left(NH_3\right)_4 CI_2\right]$ is due to

A. linkage isomerism

B.) geometrical isomerism

C.) coordination isomerism

D. ionization isomerism

Answer: B

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75. Property of the alkaline earth metals that increases with their atomic number is

A. Solubility of their hydroxides in water

B. Solubility of their sulphates in water

C. Ionization energy

D. Electronegativity

Answer: A

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76. During the kinetic study of the reaction, $2A + B \rightarrow C + D$, following results were obtained:

Run	[A]/mol L^{-1}	[B]/mol L^{-1}	Initial rate of formation of D/mol L^{-1} min^{-1}
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Bas

Bas ed on the above data which one of the following is correct?

A. $rate = k[A]^2[B]$

B. rate = k [A] [B]

C. $rate = k[A]^2[B]^2$

D. $rate = k[A][B]^2$

Answer: D

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77. Which of the following pairs has the same size ?

A. Fe^{2+}, Ni^{2+}

B. Zr^{4+}, Ti^{4+}

C. Zr^{4+}, H^{4+}

D. Zn^{2+}, Hf^{4+}

Answer: C

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78. The correct order of decreasing ionic radii among the following isoelectronic species is

A. $Ca^{2+} > K^{+} > S2^{-} > Cl^{-}$

B. $Cl^{-} > S^{2-} > Ca^{2+} > K^{+}$

C. $S^{2-} > Cl^{-} > K^{+} > Ca^{2+}$

D. $S^{2-} > Cl^{-} > K^{+} > Ca^{2+}$

Answer: C

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79. In which one of the following species , the central atom has the tuype of hybdridiztion which is not the same as that present in other three?

A. SF_4

B. I_3

C. $SbCl_5^{2-}$

D. Pci_5

Answer: C

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80. Standard entropy of X_2 , Y_2 and XY_3 are $60, 40$ and $50JK^{-1}mol^{-1}$, respectively. For the reaction, $\frac{1}{2}X_2 + \frac{3}{2}Y_2 \rightarrow XY_3, \Delta H = -30KJ$, to be at equilibrium, the temperature will be:

A. 750 K

B. 1000 K

C. 1250 K

D. 500 K

Answer: A

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81. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl?

A. $Cl < F < O < S$

B. $O < S < F < Cl$

C. $F < S < O < Cl$

D. $S < O < Cl < F$

Answer: B

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82. Which one of the following compounds is a peroxide?

A. KO_2

B. BaO_2

C. MnO_2

D. NO_2

Answer: B

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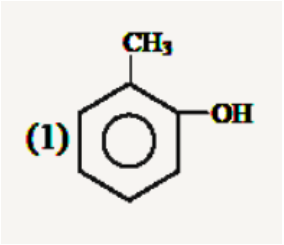
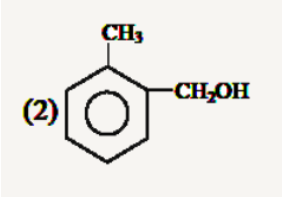
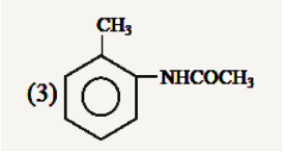
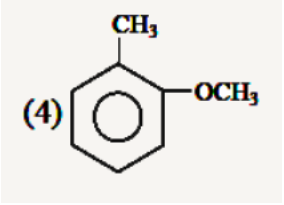
83. Which one of the following is most reactive towards electrophilic reagent ?

A. 

B. 

C. 

D. 

Answer: A

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84. Which one of the following is employed as a tranquilizer drug ?

A. Promethazine

B. Valium

C. Naproxen

D. Mifepristone

Answer: B

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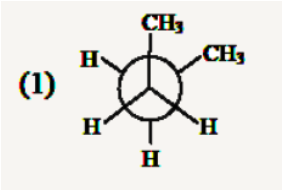
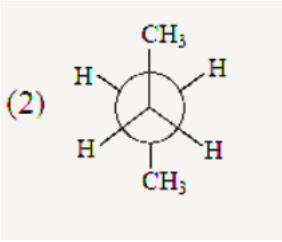
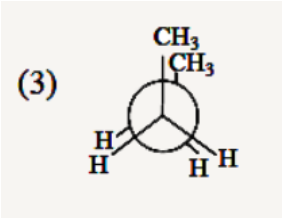
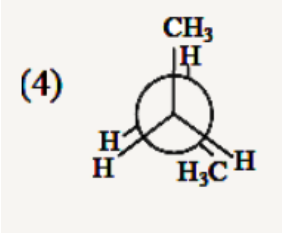
85. In the following the most stable conformation of *n*-butane is:

A. 

B. 

C. 

D. 

Answer: B

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86. Which of the following reactions will not result in the formation of carbon- carbon bond?

A. Reimer-Tieman reaction

B. Cannizaro reaction

C. Wurtz reaction

D. Friedel-Crafts acylation

Answer: B

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87. Which of the following structures represents neoprene polymer?

A. $\left(CH_2 - C(Cl) = CH - CH_2 \right)_n$

B. $\left(CH_2 - \overset{CN}{\overset{|}{C}}H \right)_n$

C. $\left(CH_2 - \overset{Cl}{\overset{|}{C}}H \right)_n$

D. $\left(C(C_6H_5N) - CH_2 \right)_n$

Answer: A

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88. Which one is most reactive towards S_{N^1} reaction?

A. $C_6H_5CH\left(C_6H_5\right)Br$

B. $C_6H_5CH\left(CH_3\right)Br$

C. $C_6H_5C\left(CH_3\right)\left(C_6H_5\right)Br$

D. $C_6H_5CH_2Br$

Answer: C

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89. AB crystallizes in a body centred cubic lattice with edge length a equal to $387pm$ .The distance between two oppositely charged ions in the lattice is :

A. 335 pm

B. 250 pm

C. 200 pm

D. 300 pm

Answer: A

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90. The number of atoms in 0.1 mol of a triatomic gas is:

A. 6.026×10^{22}

B. 1.806×10^{23}

C. 3.600×10^{23}

D. 1.800×10^{22}

Answer: B

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91. Which of the following molecular hydrises acts as a Lewis acid?

A. NH_3

B. H_2O

C. B_2H_6

D. CH_4

Answer: C

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92. The Lewis acid character of boron trihalides decreases as: $BBr_3 > BCl_3 > BF_3$. Explain ?

A. $BCl_3 > BF_3 > BBr_3$

B. $BBr_3 > BCl_3 > BF_3$

C. $BBr_3 > BF_3 > BCl_3$

D. $BF_3 > BBr_3 > BCl_3$

Answer: B

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93. The correct order of N-compounds, in its decreasing order of oxidation states is

A. HNO_3, NH_4Cl, NO, N_2

B. HNO_3, NO, NH_4Cl, N_2

C. HNO_3, NO, N_2, NH_4, Cl

D. NH_4Cl, N_2, NO, HNO_3

Answer: C

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94. Which one of following elements is unable to from MF_6^{3-} ion?

A. B

B. Al

C. Ga

D. In

Answer: A

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95. Considering Ellingham diagram, which of the following metals can be used to reduce alumina?

A. Mg

B. Zn

C. Fe

D. Cu

Answer: A

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96. The increasing order of atomic radii of the following group 13 elements is

A. $B < Ga < Al < Tl < \text{In}$

B. $B < Al < Ga < \text{In} < TI$

C. $B < Al < \text{In} < Ga < TI$

D. $B < Ga < Al < \text{In} < TI$

Answer: D

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97. Which of the following is not true for halogens ?

A. All but fluorine show positive oxidation states

B. All are oxidizing agents

C. All form monobasic oxyacids

D. Chlorine has the highest electron-gain enthalpy

Answer: A

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98. In the structure of CIF_3, the number of lone pair of electrons on central atom 'Cl' is

A. four

B. Two

C. One

D. Three

Answer: B

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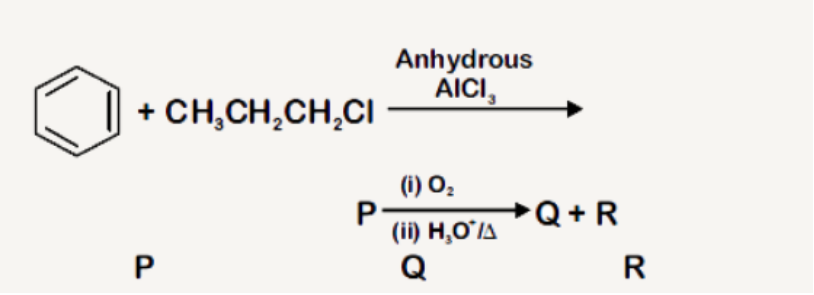
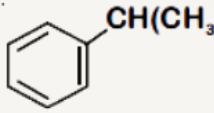
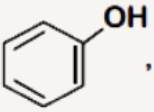
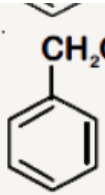
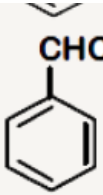
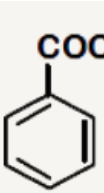
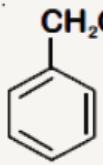
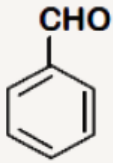
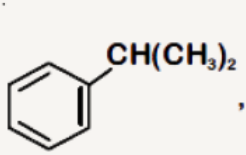
99. Identify the major products P,Q and R in the following sequence of reactions:



A. (1)  ,  , $CH_3CH(OH)CH_3$

B. (2)  ,  , 

C. (3)  ,  , CH_3CH_2-OH

D. (4)  , $CH_3-CO-CH_3$

Answer: D

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100. Which of the following compounds can form a zwitterion ?

A. Benzoic acid

B. Acetanilide

C. Aniline

D. Glycine

Answer: D

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101. Regarding cross-linked or network polymers, which of the following statements is incorrect ?

A. Examples are bakelite and melamine

B. They are formed from bi- and tri- functional monomers.

C. They contain covalent bonds between various linear polymer chains

D. They contain strong covalents bonds in their polymer chains.

Answer: D

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102. Nitration of aniline in strong acidic medium also gives m-nitroaniline because

A. In absence of substituents nitro group always goes to m-position

B. In electrophilic substituents reactions amino group is meta directive.

C. Inspite of subsituents nitro group always goes to only m-position

D. In acidic (strong) medium aniline is present as anilinium ion.

Answer: D

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103. The difference between amylose and amylopectin is

A. Amylopectin have $1 \rightarrow 4\alpha$-linkage and $1 \rightarrow 6\beta$-linkage

B. Amylose have $1 \rightarrow 4\alpha$-linkage and $1 \rightarrow 6\beta$-linkage

C. Amylopectin have $1 \rightarrow 4\alpha$-linkage and $1 \rightarrow 6\alpha$-linkage

D. Amylose is made up of glucose and galactose

Answer: C

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104. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

A. 2.8

B. 3

C. 1.4

D. 4.4

Answer: A

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105. Which of the following oxide is most acidic in nature?

A. BaO

B. BeO

C. MgO

D. CaO

Answer: B

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106. Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity?

A. N_2O

B. NO_2

C. N_2O_5

D. NO

Answer: C

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107. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give di Ethyl ether. A, B and C are in the order

A. $C_2H_5Cl, C_2H_6, C_2H_5OH$

B. $C_2H_5OH, C_2H_5Cl, C_2H_5ONa$

C. $C_2H_5OH, C_2H_6, C_2H_5Cl$

D. $C_2H_5OH, C_2H_5ONa, C_2H_5Cl$

Answer: D

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108. The compound C_7H_8 undergoes the following reactions

$$C_7H_8 \xrightarrow{3Cl_2/\Delta} A \xrightarrow{Br_2/Fe} B \xrightarrow{Zn/HCl}$$

The product 'C' is .

A. 3-brone-2,4,6- trichlorotoluence

B. o-bromotoluene

C. m-bromotoluence

D. p-bromotoluene

Answer: C

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109. Hydrocarbon(A) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms (A) is

A. CH_3 - CH_3

B. $CH_2 = CH_2$

C. $CH \equiv CH$

D. CH_4

Answer: D

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110. Which of the following molecules represents the order of hybridisation sp^2, sp^2, sp, sp from left to right atoms ?

A. $CH_2 = CH - CH = CH_2$

B. $CH_2 = CH - C \equiv CH$

C. $HC \equiv C - C \equiv CH$

D. $CH_3 - CH = CH - CH_3$

Answer: B

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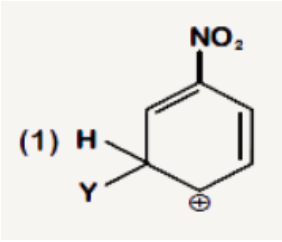
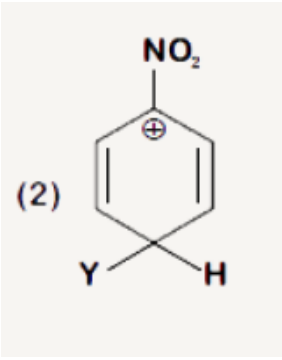
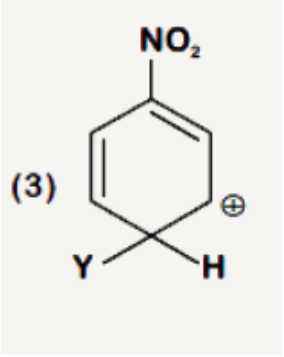
111. Which of the following carbocations is expected to be most stable?

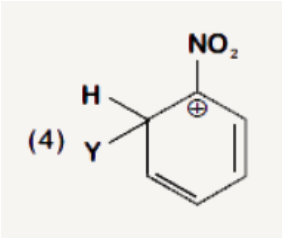
A. 

B. 

C.



D.



Answer: A

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112. Which of the following is correct with respect to $-I$ effect of the substitutes? $(R = alkyl)$

A. $-NH_2 > -OR > -F$

B. $-NR_2 < -OR < -F$

C. $-NH_2 < -OR < -F$

D. $-NR_2 > -OR > -F$

Answer: C

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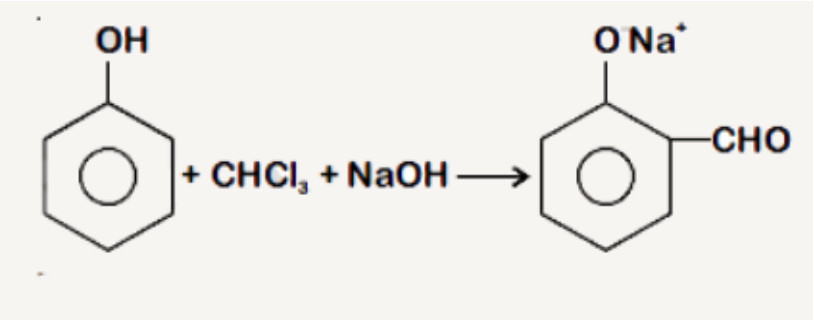
113. In the reaction



The electrophile involved is

A. Dichloromethyl anion $\left(\overset{\oplus}{C}HCl_2\right)$

B. Formly cation $\left(\overset{\oplus}{C}HO\right)$

C. Dichloromethyl cation $\left(\overset{\oplus}{C}HCl_2\right)$

D. Dichlorocarbene $\left(:CCl_2\right)$

Answer: D

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114. Carboxylic acid have higher boiling points than aldehydes, ketones and even alcohol of comparable molecular mass. It is due to their

A. More extensive association of carboxylic acid via van der Waals force of attraction

B. Formation of carboxylate ion

C. Formation of intramolecules H-bonding

D. Formation of intermolecules H-bonding

Answer: D

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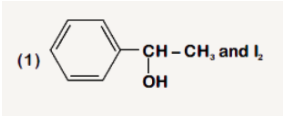
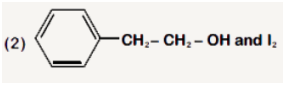
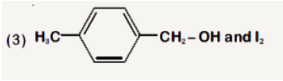
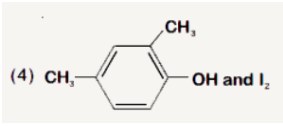
115. Compound $A, C_8H_{10}O$, is found to react with $NaOI$ (produced by reacting Y with $NaOH$) and yields a yellow precipitate with characteristic smell.

A and Y are respectively

A. 

B. 

C. 

D. 

Answer: A

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116. Match the metal ions given in Column I with the spin magnetic moments of the ions given in Column II and assign the correct code :

Column I		Column II	
a.	Co^{3+}	i.	$\sqrt{8}$ BM
b.	Cr^{3+}	ii.	$\sqrt{35}$ BM
c.	Fe^{3+}	iii.	$\sqrt{3}$ BM
d.	Ni^{2+}	iv.	$\sqrt{24}$ BM
		v.	$\sqrt{15}$ BM

A. $\begin{matrix} a & b & c & d \\ iv & i & ii & iii \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ i & ii & iii & iv \end{matrix}$

C. $\begin{matrix} a & b & c & d \\ iv & v & ii & i \end{matrix}$

D. $\begin{matrix} a & b & c & d \\ iii & v & i & ii \end{matrix}$

Answer: C

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117. Which of the following ions exhibits d-d transitions and paramagnetism as well?

A. MnO_4^-

B. $Cr_2O_7^{2-}$

C. CrO_4^{2-}

D. MnO_4^{2-}

Answer: D

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118. Iron carbonyl, $Fe(CO)_5$ is

A. Trinuclear

B. Mononuclear

C. Tetranuclear

D. Dinuclear

Answer: B

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119. The type of isomersim shown by the complex $\left[CoCl_2(en)_2\right]$ is

A. Ionization isomerism

B. Coordination isomerism

C. Geometrical isomerism

D. Linkage isomerism

Answer: C

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120. The geometry and magnetic behaviour of the complex $\left[Ni(CO)_4\right]$ are

A. square planar geometry and paramagnetic

B. Tetrahedral geometry and diamagnetical

C. Square planar geometry and diamagnetic

D. Tetrahedral geometry and paramagnetic

Answer: B

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121. Following solutions were prepared by mixing different volumes of NaOH and HCl of different concentrations:

a. 60 mL $\frac{M}{10}HCl + 40mL\frac{M}{10}$ NaOH

b. 55 mL $\frac{M}{10}HCl + 45mL\frac{M}{10}$ NaOH

c.75 mL $\frac{M}{5}HCl + 25mL\frac{M}{5}$ NaOH

d. 100 mL $\frac{M}{10}HCl + 100mL\frac{M}{10}$ NaOH

pH of which one of them will be equal to 1 ?

A. d

B. a

C. b

D. c

Answer: D

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122. On which of the following properties does the coagulating power of an ion depend?

A. Both magnitude and sign of the charge on the ion

B. Size of the ion alone

C. The magnitude of the charge on the ion alone

D. The sign of charge on the ioin alone

Answer: A

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123. Given van der Waals constant for NH_3, H_2, O_2 and CO_2 are respectively $4.17, 0.244, 1.36$ and 3.59, which one of the following gases is most easily liquefied?

A. O_2

B. H_2

C. NH_3

D. CO_2

Answer: C

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124. The solubility of $BaSO_4$ in water is $2.42 \times 10^{-3} gL^{-1}$ at $298K$. The value of its solubility product $\left(K_{sp}\right)$ will be (Given molar mass of $BaSO_4 = 233 gmol^{-1}$)

A. $1.08 \times 10^{-14} \text{mol}^2 L^{-2}$

B. $1.08 \times 10^{-12} \text{mol}^2 L^{-2}$

C. $1.08 \times 10^{-10} \text{mol}^2 L^{-2}$

D. $1.08 \times 10^{-8} \text{mol}^2 L^{-2}$

Answer: C

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125. In which case is the number of molecules of water maximum?

A. 0.00224 L of water vapours at 1 atm and 273 K

B. 0.18 g of water

C. 18 mL of water

D. 10^{-3} mol of water

Answer: C

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126. The correct difference between first and second order reactions is that

A. A first order reaction can catalyzed, a second-order reaction cannot be catalyzed

B. The half -life of a first-order reaction does not depend on $[A]_0$, the half-life of a second-order reaction does depend on $[A]_0$

C. The rate of first-order reaction does not depend on reactant concentrations, the rate of a second-order reaction does depend on reactant concentrations.

D. The rate of frist-order reaction does not depend on reactant concentrations, the rate of a second-order reaction does not depend on reactant concentrations

Answer: B

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127. Among $CaH_2, BeH_2, BaH_2,$ the order of ionic character is

A. $BeH_2 < BaH_2 < CaH_2$

B. $CaH_2 < BeH_2 < BaH_2$

C. $BeH_2 < CaH_2 < BaH_2$

D. $BaH_2 < BeH_2 < CaH_2$

Answer: C

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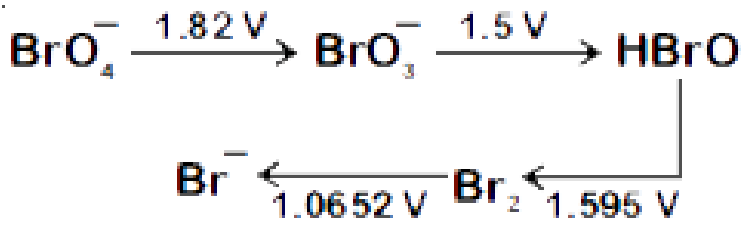
128. Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below :



Then the species undergoing disproportionation is

A. Br_2

B. BrO_4^-

C. BrO_3^-

D. $HBrO$

Answer: D

View Text Solution

129. For the redox reaction

$$MnO_4^{\ominus} + C_2O_4^{2-} + H^{\oplus} \rightarrow Mn^{2+} + CO_2 + H_2O$$

the correct coefficients of the reactions for the balanced reaction are

A. MnO_4^- $C_2O_4^{2-}$ H^+
2 16 5

B. MnO_4^- $C_2O_4^{2-}$ H^+
2 5 16

C. MnO_4^- $C_2O_4^{2-}$ H^+
16 5 2

D. MnO_4^- $C_2O_4^{2-}$ H^+
5 16 2

Answer: B

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130. Which one of the following condition will favour maximum formation of the product in the reaction. $A_2(g) + B_2(g) \Leftrightarrow X_2(g) \Delta_r H = -X$ kJ ?

A. High temperature and high pressure

B. Low temperature and low pressure

C. Low temperature and high pressure

D. High temperature and low pressure

Answer: C

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131. when initial concentration of the reactant is doubled, the half-life period of a zero order reaction

A. Is tripled

B. Is doubled

C. Is halved

D. Remains unchanged

Answer: B

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132. If the bond dissociation energies of XY,X_2 and Y_2 are in the ratio of $1:1:0.5$ and ΔH_f for the formation of Xy is -$200KJ/mol$. The bond

dissociation energy of X_2 will be : -

A. 800 KJ mol^{-1}

B. 100 KJ mol^{-1}

C. 200 KJ mol^{-1}

D. 400 KJ mol^{-1}

Answer: A

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133. The correction factor a to the ideal gas equation corresponds to

A. Electric field present between the gas molecules

B. Volume of the gas molecules

C. Density of the gas molecules

D. Forces of attraction between the gas molecules

Answer: D

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134. Consider the following species

CN^-, CN^-, NO and CN`.

Which one of these will hqave the highest bond order ?

A. CN^+

B. CN^-

C. NO

D. CN

Answer: B

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135. Magnesium reacts with an element (X) is forms a ionic compound .If the ground state electron configuration of (X) is $1s^2 2s^2 2p^2$, the simple formula for the compound is

A. Mg_2X

B. MgX_2

C. Mg_2X_3

D. Mg_3X_2

Answer: D

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136. Iron exhibits b structure at roomj temperature. Above $9000^\circ C$, it transformers to f structure. The ratio of density of iron at room temperature to that at $900^\circ C$ (assuming molar mass and atomic radius of iron remains constant with temperature) is

A. $\frac{3\sqrt{3}}{4\sqrt{2}}$

B. $\frac{4\sqrt{3}}{3\sqrt{2}}$

C. $\frac{\sqrt{3}}{\sqrt{2}}$

D. $\frac{1}{2}$

Answer: A

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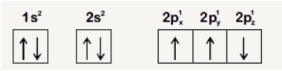
137. Which one is a wrong statement ?

A. The electronic configuration of N atom is



B. An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers.

C. Total orbital angular momentum of electron in 's' orbital is equal to zero

D. The value of m for $d_2 2$ is zero.

Answer: A

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138. Statement 1: Aspirin and paracetamol belong to the class of narcotic analgesics.

Statement 2: Morphine and Heroine are non-narcotic analgesics.

In the light of the above statements, choose the correct answer from the options given below:

A. Statement 1 is Correct, Statement 2 is False.

B. Statement 1 is incorrect, Statement 2 is true.

C. Both Statement 1 and Statement 2 are true

D. Both Statement 1 and Statement 2 are false

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139. Zr(Z=40) and Hf(Z=72) have similar atomic and ionic radii because of:

A. lanthanoid contraction

B. having similar chemical properties

C. belonging to same group

D. diagonal relationship

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140. The correct sequence of bond enthalpy of C-X bond is:

A. $CH_3 - F < CH_3 - Cl > CH_3 - Br > CH_3 - I$

B. $CH_3 - Cl > CH_3 - F > CH_3 - Br > CH_3 - I$

C. $CH_3 - F > CH_3 - Cl > CH_3 - Br > CH_3 - I$

D. $CH_3 - F < CH_3 - Cl < CH_3 - Br < CH_3 - I$

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141. Ethylene diaminetetraacetate(EDTA) ion is:

A. Bidentate ligand with two "N" donor atoms

B. Tridentate ligand with three "N" donor atoms

C. Hexadentate ligand with four "O" and two "N" donor atoms

D. Unidentate ligand

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142. BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom respectively are:

A. sp^2 and 6

B. sp^2 and 8

C. sp^3 and 4

D. sp^3 and 6

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143. A particular station of All India Radio,New Delhi, broadcasts on a frequency of 1,368kHz. The wavelength of the electromagnetic radiation emitted by the transmitter is: (speed of light, c= $3.0 \times 10^{8} ms^{-1}$

A. 2192m

B. 21.92m

C. 219.3m

D. 219.2m

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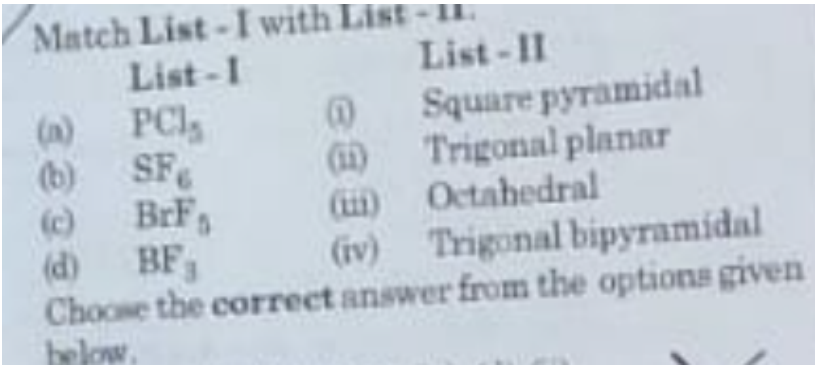
144. Match the following columns



A. a-iii,b-i,c-iv,d-ii

B. a-iv,b-iii,c-ii.d-i

C. a-iv,b-iii,c-i,d-ii

D. a-ii,b-iii,c-iv,d-i

Answer: C

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145. Dihedral angle of least stable conformer of ethane is:

A. 60°

B. 0°

C. 120°

D. 180°

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146. Which of the following reactions is the metal displacement reaction?

Chosse the right option

A. $Fe + 2HCl \rightarrow FeCl_2 + H_2 \uparrow$

B. $2Pb\left(NO_3\right)_2 \rightarrow 2PbO + 4NO_2 + O_2 \uparrow$

C. $2KClO_3 \xrightarrow{\triangle} 2KCl + 3O_2$

D. $Cr_2O_3 + 2Al \xrightarrow{\triangle} Al_2O_3 + 2Cr$

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147. The compound which shows metamerism is:

A. C_3H_6O

B. $C_4H_{10}O$

C. C_5H_{12}

D. C_3H_8O

Answer: B

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148. Which one among the following is the correct option for right relationship between C_p and C_v for one mole of ideal gas?

A. $C_p = RC_v$

B. $C_v = RC_p$

C. $C_p + C_v = R$

D. $C_p - C_v = R$

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149. Which one of the following polmers is prepared by addition polymerisation?

A. Navolac

B. Dacron

C. Teflon

D. Nylon-6,6

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150. The right option for the statement "Tyndall effect is exhibited by" is:

A. Starch solution

B. Urea solution

C. NaCl solution

D. Glucose solution

Answer: A

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151. The correct option for the number of body centred unit cells in all 14 tyes of bravais lattice unit cells is:

A. 2

B. 3

C. 7

D. 5

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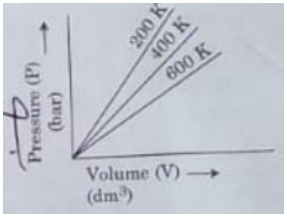
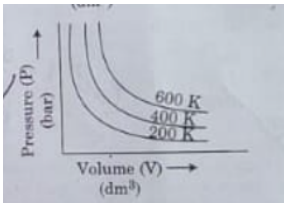
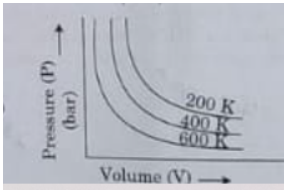
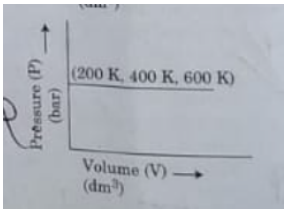
152. Choose the correct option for graphical representation of Boyle's Law, which shows a graph of pressure vs volume of gas at different temperatures:

A. 

B. 

C. 

D. 

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153. Noble gases are named because of their inertness towards reactivity. Identify as incorrect statement about them.

A. Noble gases have weak dispersion forces

B. Noble gases have large positive values of electron gain enthalpy

C. Noble gases are sparingly soluble in water

D. Noble gases have very high melting and boiling points

Answer: D

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154. Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature?

A. Distillation

B. Zone refining

C. Electrolysis

D. Chromatography

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155. Tritium, a radioactive isotope of hydrogen, emits which of the following particles?

A. Gamma

B. Neutron

C. Beta($\beta-$)

D. Alpha(α)

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156. Among the following alkaline earth metal halides, one which is covalent and solube in organic solvents is:

A. Magnesium chloride

B. Beryllium chloride

C. Calccium chloride

D. Strontium chloride

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157. The pK_b of dimethylamine and pK_a of acetic acid are 3.27 and 4.77 respectively at T(K). The correct option for the pH of dimethyammonium acetate solution is:

A. 7.75

B. 6.25

C. 8.5

D. 5.5

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158. The molar conductance of NaCl,HCl and CH_3COONa at infinite dilution are 126.45,426.16 and 91.0 Scm^2mol^{-1} respectively. The molar conductance of CH_3COOH at infinite dilution is

A. $698.28Scm^2mol^{-1}$

B. $540.48Scm^2mol^{-1}$

C. $201.28Scm^2mol^{-1}$

D. $390.71Scm^2mol^{-1}$

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159. What is the IUPAC name of the organic compound formed in the following chemical reaction?

$$\text{Acetone} \xrightarrow[H_2O, H^+]{C_2H_5MgBr\,.\,dryether} \text{product}$$

A. Pentan-3-ol

B. 2-methylbutan-2-ol

C. 2-methylpropan-2-ol

D. pentan-2-ol

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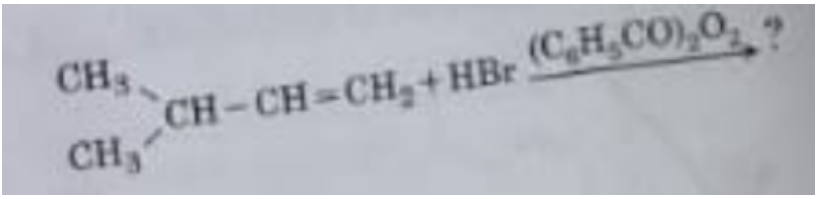
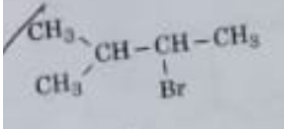
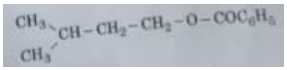
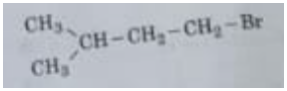
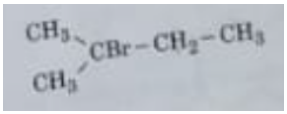
160. The major product of the following chemical reaction is:



A. 

B. 

C. 

D. 

Answer: D

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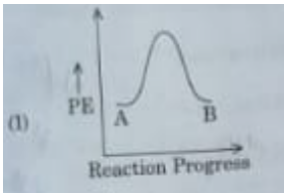
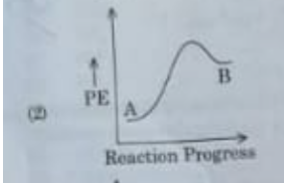
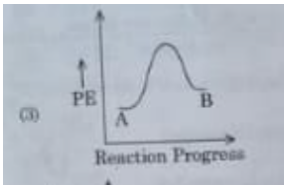
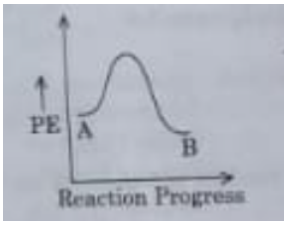
161. For a reaction $A \rightarrow B$, enthalpy of reaction is $-4.2 kJmol^{-1}$ and enthalpy of activation is $9.6 KJmol^{-1}$. The correct potential energy profile for the reaction is shown in option.

A. 

B. 

C. 

D. 

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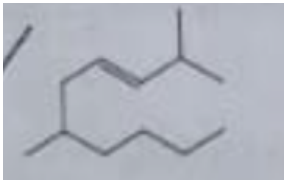
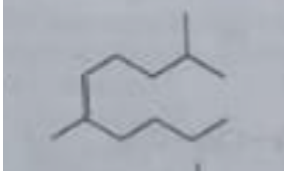
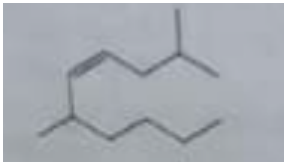
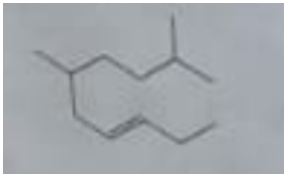
162. The correct structure of 2,6-Dimethyl-dec-4-ene is:

A. 

B. 

C. 

D. 

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163. Statement 1: Acid strength increases in the order given as $HF < < HCl < < HBr < < HI$.

Statement 2: As the size of the elements F, Cl, Br, I increases down the group, the bond strength of HF, HCl, HBr and HI decreases and so the acid strength increases.

In the light of the above statements, choose the correct answer from the options given below:

A. Statement 1 is Correct, Statement 2 is False.

B. Statement 1 is incorrect, Statement 2 is true.

C. Both Statement 1 and Statement 2 are true

D. Both Statement 1 and Statement 2 are false

Answer: C

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164. The major product formed in dehydrohalogenation reaction of 2-bromopentane is pen-2-ene. This product formation is based on?

A. Hofmann Rule

B. Huckel's Rule

C. Saytzeff's Rule

D. Hund's Rule

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165. An organic compound contained 78%(by wt.) carbon and remaining % of hydrogen. The right option for the empirical formula of this compound is:

A. CH_3

B. CH_4

C. CH

D. CH_2

Answer: A

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166. The RBC deficiency is deficiency disease of:

A. Vitamin B_1

B. Vitamin B_2

C. Vitamin B_{12}

D. Vitamin B_6

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167. The maximum temperature that can be achieve in blast furnance is:

A. upto 1900K

B. upto 5000K

C. upto 1200K

D. upto 2200K

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168. The incorrect statements among the following is:

A. Lanthanoids are good conductors of heat and electricity

B. Actinoids are highly reactive metals, especially when finely divided

C. Actinoid contraction is greater for element to element than Lanthanoid contraction

D. Most of the trivalent Lanthanoid ions are colorless in ths solid state

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169. The structures of beryllium chloride in solid state and vapour pahse are:

A. Dimer and linear rspectively

B. Chain in both

C. Chain and dimer respectively

D. Linear in both

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170. Right option for the number oof tetrahedral and octahedral voids in hexagonal primitive unit cell are:

A. 2,1

B. 12,6

C. 8,4

D. 6,12

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171. The following solutions were prepared by dissolving 10g of glucose in 250ml of water(P_1), 10g of urea (CH_4N_2O) in 250ml of water(P_2) and 10g of sucrose ($C_{12}H_{22}O_{11}$) in 250ml of water(P_3). The right option for the decreasing order of osmotic pressure of those solutions is:

A. $P_2 > P_3 > P_1$

B. $P_3 > P_1 > P_2$

C. $P_2 > P_1 > P_3$

D. $P_1 > P_2 > P_3$

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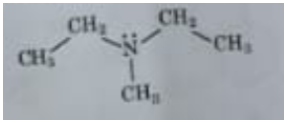
172. Identift the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali.

A. CH_3 - CH_2 - NH_2

B. 

C. CH_3 - CH_2 - NO_2

D. CH_3 - CH_2 - NH - CH_3

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173. The correct option for the values of vapour pressure of a solution at $45^{\circ}C$ with benzene to octane in molar ration 3:2 is:

[At $45^{\circ}C$ vapour pressure of benzene is 280mm Hg and that of octane is 420mm Hg, Assume ideal gas]

A. 336 mm of Hg

B. 350 mm of Hg

C. 160 mm of Hg

D. 168 mm of Hg

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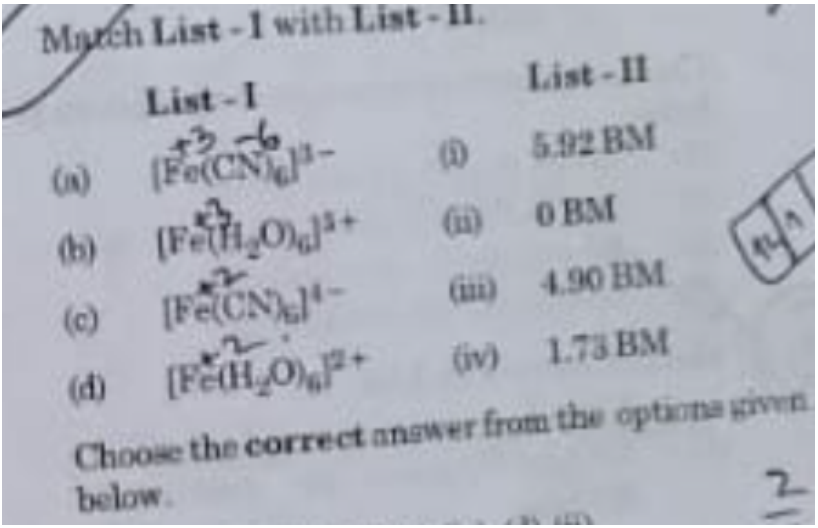
174. Match the following columns



A. a-i,b-iii,c-iv,d-ii

B. a-iv,b-i,c-ii,d-iii

C. a-iv,b-ii,c-i,d-iii

D. a-ii,b-iv,c-iii,d-i

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175. From the following pairs of ions which one is not an iso-electronic pair?

A. Mn^{2+}, Fe^{3+}

B. Fe^{2+}, Mn^{2+}

C. O^{2-}, F^{-}

D. Na^{+}, Mg^{2+}

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176. Which of the following molecules is non-polar in nature?

A. $SbCl_5$

B. NO_2

C. $POCl_3$

D. CH_2O

Answer: A

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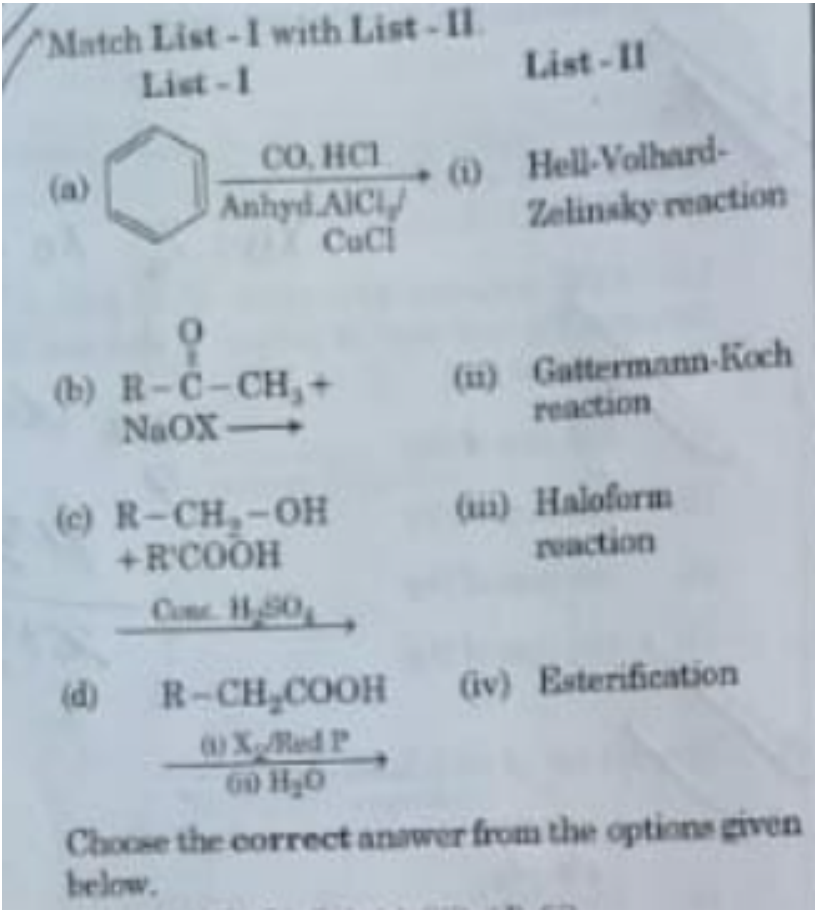
177. Match the following columns



A. a-i,b-iv,c-iii,d-ii

B. a-ii,b-iii,c-iv,d-i

C. a-iv,b-i,c-ii,d-iii

D. a-iii.b-ii,c-i,d-iv

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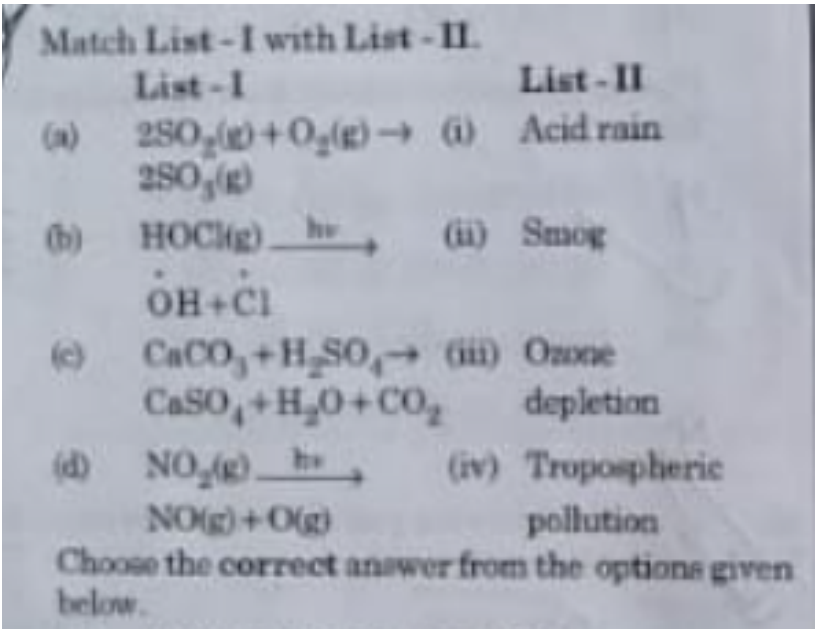
178. Match the following columns


Match List - I with List - II.

	List - I		List - II
(a)	$2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$	(i)	Acid rain
(b)	$HOCl(g) \xrightarrow{h\nu} \dot{O}H + \dot{C}l$	(ii)	Smog
(c)	$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$	(iii)	Ozone depletion
(d)	$NO_2(g) \xrightarrow{h\nu} NO(g) + O(g)$	(iv)	Tropospheric pollution

Choose the correct answer from the options given below.

A. a-iv,b-iii,c-i,d-ii

B. a-iii,b-ii,c-iv,d-i

C. a-i,b-ii,c-iii,d-iv

D. a-ii,b-iii,c-iv,d-i

Answer: A

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179. The slope of Arrhenius Plot (lnK v/s 1/T) of 1st order reaction is -5×10^3 K. The value of E_a of the reaction is.

A. $166 KJmol^{-1}$

B. $-83 KJmol^{-1}$

C. $41.5 KJmol^{-1}$

D. $83.0 KJmol^{-1}$

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180. For irreversible expansion of an ideal gas under isothermal condition, the correct option is:

A. $\Delta U = 0, \Delta S_{\text{total}} \neq 0$

B. $\Delta U \neq 0, \Delta S_{\text{total}} = 0$

C. $\Delta U = 0, \Delta S_{\text{total}} = 0$

D. $\Delta U \neq 0, \Delta S_{\text{total}} \neq 0$

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181. In which one of the following arrangements the given sequence is not strictly according to the properties indicated against it?

A. $NH_3 < PH_3 < AsH_3 < SbH_3$: Increasing acidic character

B. $CO_2 < SiO_2 < SnO_2 < PbO_2$: Increasing oxidizing power

C. $HF < HCl < HBr < HI$: Increasing acidic strength

D. $H_2O < H_2S < H_2Se < H_2Te$: Increasing pK_a values

Answer: D

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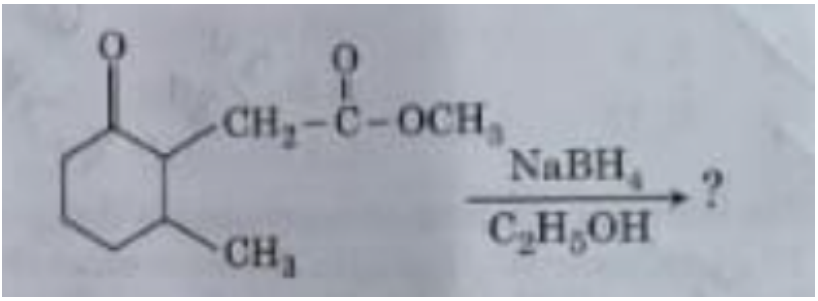
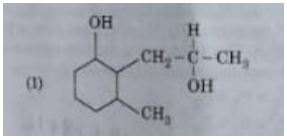
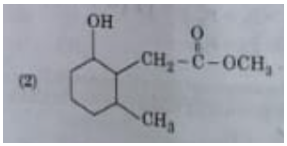
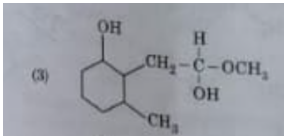
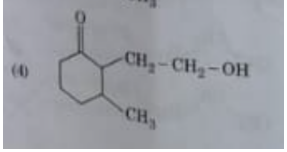
182. The product formed in the following chemical reaction is:



A. 

B. 

C. 

D. 

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183. Choose the correct option for the total pressure(in atm) in a mixture of 4g O_2 and 2g of H_2 confined in a total vloume of 1L at $0\ ^\circ C$ is:

[Given R= 0.082 $Latmmol^{-1}K^{-1}$, T=273K]

A. 25.18

B. 26.02

C. 2.518

D. 2.602

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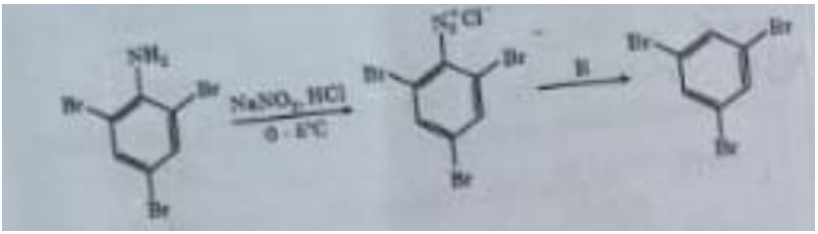
184. The reagent R in the given sequence of chemical reaction is:



A. HI

B. $CuCN/KCN$

C. H_2O

D. CH_3CH_2OH

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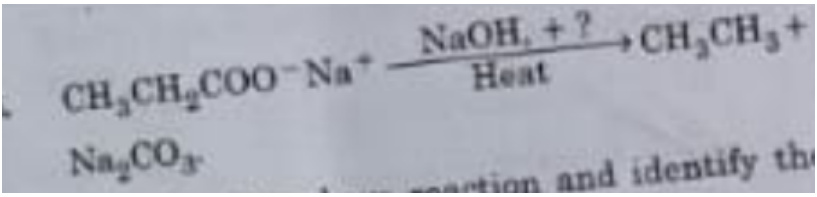
185.



Consider the above reaction and identify the missing reagent/chemical

A. CaO

B. DIBAL-H

C. B_2H_6

D. Red phosphorus

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186. The molar conductivity of 0.007M acetic acid is $20Scm^2mol^{-1}$. What is the dissociaion constant of acetic acid? choose the correct option.

$\left[\Lambda^{\circ}_{H^+} = 350Scm^2mol^{-1}\ \Lambda^{\circ}_{CH_3COO^-} = 50Scm^2mol^{-1}\right]$

A. $1.75 \times 10^{-5}molL^{-1}$

B. $2.50 \times 10^{-5}molL^{-1}$

C. $1.75 \times 10^{-4}molL^{-1}$

D. $2.50 \times 10^{-4}molL^{-1}$

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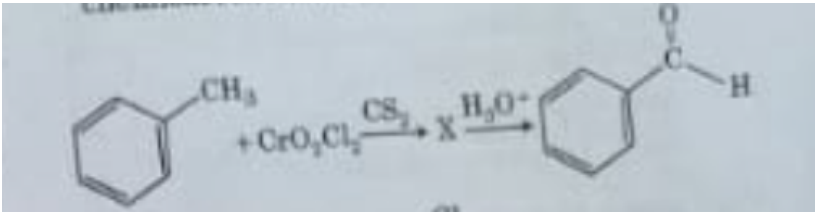
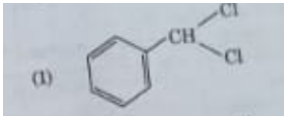
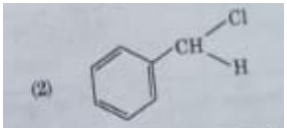
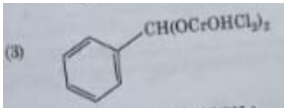
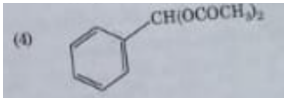
187. The intermediate compound X in the following chemical reaction is:



A. 

B. 

C. 

D. 

Answer: C

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188. Gadolinium has a low value of third ionisation enthalpy because of

A. small size

B. high exchange enthalpy

C. high electronegativity

D. high basic character

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189. Which one is not correct mathematical equation for Dalton's Law of partial pressure ? Here p= total pressure of gaseous mixture

A. $p = p_1 + p_2 + p_3$

B. $p = n_1\frac{RT}{V} + n_2\frac{RT}{V} + n_3\frac{RT}{V}$

C. $p_i = \chi_i p$

D. $p_i = \chi_i p_i^{\circ}$

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190. Given below are two statements : one is labelled as Assertion(A) and the other is labelled as Reason (R) :

Assertion (A) :

In a particular point defect, an ionic solid is electrically neutral, even if few of its cations are missing from its unit cells.

Reason (R) :

In an ionic solid, Frenkel defect arises due to dislocation of cation from its lattice site to interstitial site, maintaining overall electrical neutrality. In the light of the above statements, choose the most appropriate answer from the options given below :

A. Both (A) and (R) are correct and (R) is the correct explanation of (A)

B. Both (A) and (R) are correct but (R) is not the correct explanation of (A)

C. (A) is correct but (R) is not correct

D. (A) is not correct but (R) is correct

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191. The pH of the solution containing 50 mL each of 0.10 M sodium acetate and 0.01 M acetic acid is [Given pK_a of $CH_3COOH = 4.57$]

A. 5.57

B. 3.57

C. 4.57

D. 2.57

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192. Identify the incorrect statement from the following

A. Alkali metals react with water to form their hydroxides.

B. The oxidation number of K in KO_2 is $+4$.

C. Ionisation enthalpy of alkali metals decreases from top to bottom in the group.

D. Lithium is the strongest reducing agent among the alkali metals.

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193. Given below are two statements :

Statement I :

The acidic strength of monosubstituted nitrophenol is higher than phenol because of electron withdrawing nitro group.

Statement II:

o-nitrophenol,m-nitrophenol and p-nitrophenol will have same acidic strength as they have one nitro group attached to the phenolic ring.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both Statement I and Statement II are correct

B. Both Statement I and Statement II are incorrect

C. Statement is correct but Statement II is incorrect

D. Statement I is incorrect but Statement II is correct

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194. What mass of 95 % pure $CaCO_3$ will be required to neutralise 50 mL of 0.5 M HCl solution according to the following reaction?

$$\left(CaCO_3\right)_s + 2HCl_{aq} \rightarrow \left(CaCl_2\right)_{aq} + CO_2\_(g) + 2H_2O_l$$

[Calculate upto second place of decimal point]

A. 1.25 g

B. 1.32 g

C. 3.65 g

D. 9.5 g

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195. The IUPAC name of an element with atomic number 119 is

A. ununennium

B. unnilennium

C. unununnium

D. ununoctium

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196. Choose the correct statement :

A. Diamond and graphite have two dimensional network.

B. Diamond is covalent and graphite is ionic.

C. Diamond is sp^3 hybridised and graphite is sp^2 hybridised.

D. Both diamond and graphite are used as dry lubricants.

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197. Given below are two statements:

Statement I:

In the coagulation of a negative sol, the flocculating power of the three given ions is in the order -

$Al^{3+} > Ba^{2+} > Na^{+}$

Statement II :

In the coagulation of a positive sol, the flocculating power of the three given salts is in the order - $NaCl > Na_2SO_4 > Na_3PO_4$

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both Statement I and Statement II are correct

B. Both Statement I and Statement II are incorrect

C. Statement is correct but Statement II is incorrect

D. Statement I is incorrect but Statement II is correct

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198. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

Reason R : The deep blue solution is due to the formation of amide.

In the light of the above statements, choose the correct answer from the option given below :

A. Both A and R are true but R is NOT the correct explanation of A.

B. A is true but R is false.

C. A is false but R is true.

D. Both A and R are true and R is the correct explanation of A.

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199. The conductivity of centimolar solution of KCl at $25^\circ C$ is $0.0210 ohm^{-1} cm^{-1}$ and the resistance of the cell containing the solution at $25^\circ C$ is $60 ohm$. The value of cell constant

A. $3.28 cm^{-1}$

B. $1.26 cm^{-1}$

C. $3.34 cm^{-1}$

D. $1.34 cm^{-1}$

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200. For a certain reaction, the rate $= k[A]^2[B]$ when the initial concentration of A is tripled keeping concentration of B constant, the initial rate whould

A. increase by a factor of six

B. increase by a factor of nine.

C. increase by a factor of three

D. decrease by a factor of nine.

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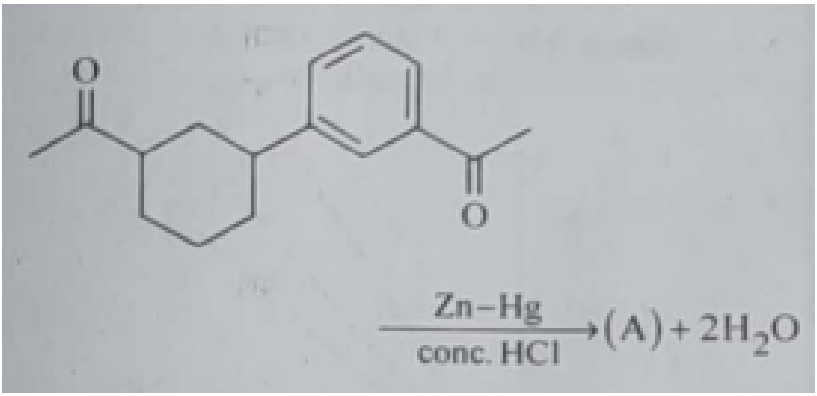
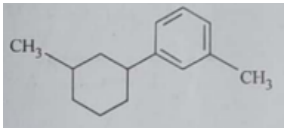
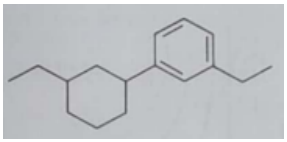
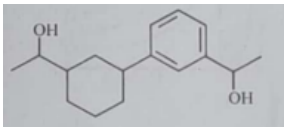
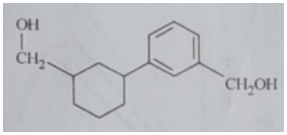
201. Identify product (A) in the following reaction:



A. 

B. 

C. 

D. 

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202. Which one is an example of heterogenous catalysis ?

A. Hydrolysis of suger catalysed by H^+ ions.

B. Decomposition of ozone in presence of nitrogen monoxide.

C. Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron.

D. Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen.

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203. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : Helium isiused to dilute oxygen in diving apparatus.

Reasons R : Helium has high solubility in O_2

In the light of the above statements, choose the correct answer from the options given below:

A. Both A and R are true but R is NOT the correct explanation of A.

B. A is true but R is false.

C. A is false but R is true.

D. Both A and R are true and R is the correct explanation of A.

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204. Amongst the following, the total number of species NOT having eight electrons around central atom in its outer most shell, is

$NH_3, AlCl_3, BeCl_2, CCl_4, PCl_5$:

A. 2

B. 4

C. 1

D. 3

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205. The correct order of energies of molecular orbitals of N_2 molecule, is:

A.

$$\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \left(\pi 2p_z = \pi 2\pi_y\right) < \left(\pi^* 2p_x = \pi^* 2p_y\right)$$

B.

$$\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \sigma^* 2p_z < \left(\pi 2p_z = \pi 2\pi_y\right) < \left(\pi^* 2p_x$$

C.

$$\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \left(\pi 2p_z = \pi 2\pi_y\right) < \left(\pi^* 2p_x = \pi^* 2p_y\right) < \sigma 2p_z$$

D.

$$\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \left(\pi 2p_z = \pi 2\pi_y\right) < \sigma 2p_z < \left(\pi^* 2p_x = \pi^* 2p_y\right)$$

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206. Match List-I with List-II :

	List - I		List - II
A.	Coke	I.	Carbon atoms are sp^3 hybridised.
B.	Diamond	II.	Used as a dry lubricant
C.	Fullerene	III.	Used as a reducing agent
D.	Graphite	IV.	Cage like molecules

Choose the correct answer from the options given below :

A. *A - IV, B - I, C - II, D - III*

B. *A - III, B - I, C - IV, D - II*

C. *A - III, B - IV, C - I, D - II*

D. *A - II, B - IV, C - I, D - III*

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207. The number of σ bonds, π bonds and 1one pair of electrons in pyridine, respectively are:

A. 12,3,0

B. 11,3,1

C. 12,2,1

D. 11,2,0

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208. The element ecpected to form largest ion to achieve the nearest noble gas configuration is:

A. F

B. N

C. Na

D. O

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209. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : A reaction can have zero activation energy.

Reasons R : The minimum extra amount of energy by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

In the light of the above statements, choose the correct answer from the options given below :

A. Both A and R are true but R is NOT the correct explanation of A.

B. A is true but R is false.

C. A is false but R is true.

D. Both A and R are true and R is the correct explanation of A.

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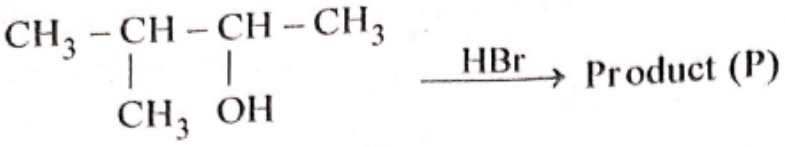
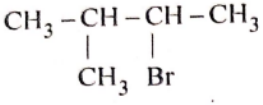
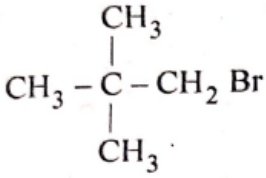
210. Consider the following reaction and identify the product (P).

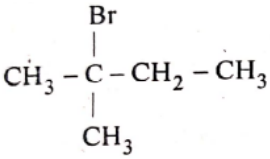


3 – Methylbutan–2–ol

A. $CH_3 - CH = CH - CH_3$

B. 

C. 

D. 

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211. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : In the equation $\Delta_r G = -nFE_{cell}$, value $\Delta_r G$ depends on n .

Reasons R : E_{cell} is an intensive property and $\Delta_r G$ is an extensive property .

In the light of the above statements, choose the correct answer from the options given below :

A. Both A and R are true but R is NOT the correct explanation of A.

B. A is true but R is false.

C. A is false but R is true.

D. Both A and R are true and R is the correct explanation of A.

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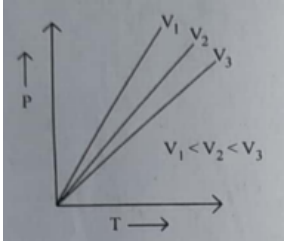
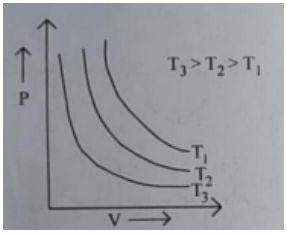
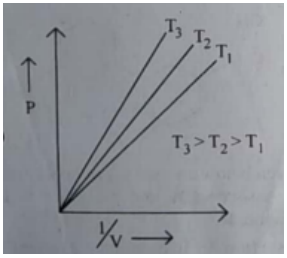
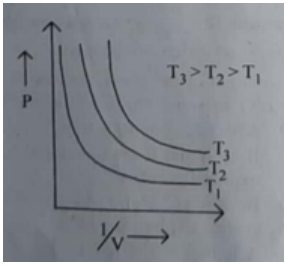
212. Which amongst the following options is correct graphical representation of Boyle's Law?

A. 

B. 

C. 

D. 

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213. In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe^{3+} due to the formation of -

A. $NaSCN$

B. $\left[Fe(CN)_5NOS\right]^{4-}$

C. $[Fe(SCN)]^{2+}$

D. $Fe_4\left[Fe(CN)_6\right]_3.xH_2O$

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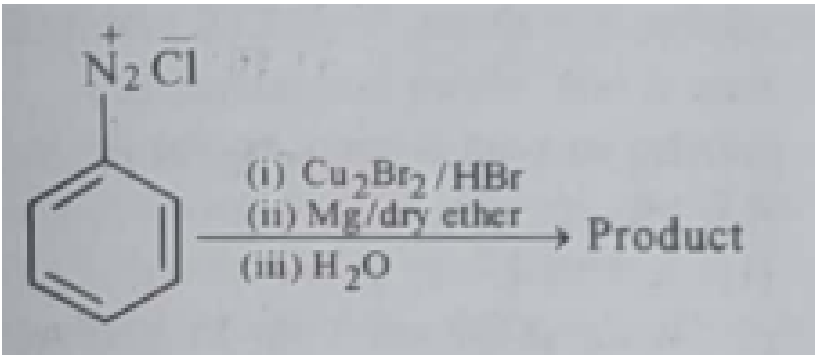
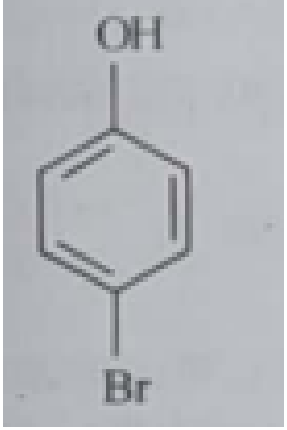
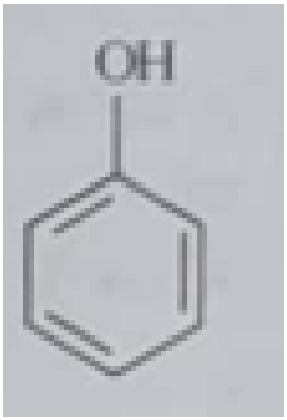
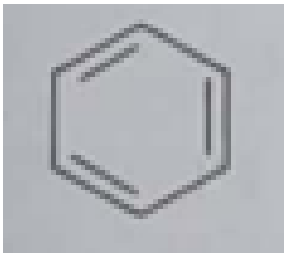
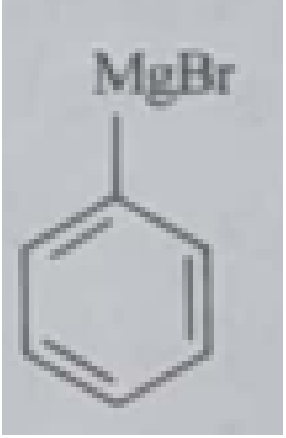
214. Identify product in the following reaction:



A. 

B. 

C. 

D. 

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215. Select the correct statements. from the following :

A. Atoms of all elements are composed of two fundamental particles.

B. The mass of the electron is $9.10939 \times 10^{-31} kg$

C.. All the isotopes of a given element show same chemical properties .

D. Protons and electrons are collectively known as nucleons.

E. Dalton's atomic theory, regarded the atom as an ultimate particle of matter.

Choose the correct answer from the options given below :

A. C,D and E only

B. A and E only

C. B, C and E only

D. A, B and C only

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216. A compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy $1/3$ of tetrahedral voids. If the formula of the compound is A_xB_y, then the value of $x + y$ is in option

A. 4

B. 3

C. 2

D. 5

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217. Given below dre two statements :

Statement I : A unit formed by the attachment of a base to $1'$ pasion of sugar is known as nucleoside

Statement II : When nucleoside is linked to phosphorous acid at $5'$-position of sugar moiety, we get nucleotide.

In the light of the above statements, choose the correct answer from the options given below :

A. Both Statement I and Statement II are false.

B. Statement I is true but Statement II are false.

C. Statement I is false but Statement II are true.

D. Both Statement I and Statement II are true.

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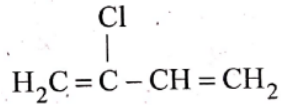
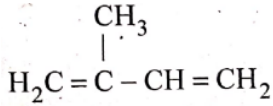
218. Which amongst the following molecules on polymerization produces neoprene ?

A. 

B. $CH_2 = CH - C = \ - CH$

C. 

D. $CH_2 = CH - CH = CH_2$

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219. Taking satability as the factor, which one of the following represents correct relationship

A. $InI_3 > InI$

B. $AlCl > AlCl_3$

C. $TlI > TlI_3$

D. $TlCl_3 > TlCl$

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220. Some tranquilizer are listed below.Which one from the following belongs to barbiturates?

A. Meprobamate

B. Valium

C. Veronal

D. Chlordiazepoxide

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221. Which of the following statements are NOT correct?

A. Hydrogen is used to reduce heavy metal oxides to metals.

B. Heavy water is used to study reaction mechanism.

C. Hydrogen is used to make satur ated fats from oils.

D. The H-H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any element.

E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below :

A. B,D only

B. D, E only

C. A,B,C only

D. B,C,D,E only

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222. Intermolecular forces are forces of attraction and repulsion between interacting particles that will include :

A. dipole - dipole forces.

B. dipole - induced dipole forces.

C. hydrogen bonding.

D. covalent bonding.

E. dispersion forces.

Choose the most appropriate answer from the options given below :

A. A, B, C, D are correct.

B. A, B, C, E are correct

C. A, C, D, E are correct

D. B, C, D, E are correct

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223. Amongst the given options which of the following molecules/ion acts as a Lewis acid?

A. H_2O

B. BF_3

C. OH^-

D. NH_3

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224. The right option for the mass of CO_2 produced by heating 20g of 20 % pure limestone is (Atomic mass of Ca =40)

$$\left[CaCO_3 \xrightarrow{1200K} CaO + CO_2\right]$$

A. 1.76g

B. 2.64g

C. 1.32 g

D. 1.12 g

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225. The relation between n_m, (n_m = the number of permissible values of magnetic quantum number (m)) for a given value of azimuthal quantum number (l)), is

A. $l = 2n_m + 1$

B. $n_m = 2l^2 + 1$

C. $n_m = l + 2$

D. $l = \frac{n_m - 1}{2}$

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226. The stability of Cu^{2+} is more than Cu^{+} salts in aqueous solution due to -

A. enthalpy of atomization

B. hydration energy

C. second ionisation enthalpy.

D. first ionisation enthalpy

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227. Which one of the following statements is correct?

A. All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor.

B. The bone in human body is an inert and unchanging substance.

C. Mg plays roles in neuromuscular function and interneuronal transmission.

D. The daily requirement of Mg and Ca in the human body is estimated to be 0.2 - $0.3g$.

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228. Which of the following reactions will NOT give primary amine as the product?

A. $CH_3CN \xrightarrow[(ii)H_3O^*]{(i)LiAlH_4} \text{Product}$

B. $CH_3NC \xrightarrow[(ii)H_3O^*]{(i)LiAlH_4} \text{Product}$

C. $CH_3CONH_2 \xrightarrow[(ii)H_3O^*]{(i)LiAlH_4} \text{Product}$

D. $CH_3CONH_2 \xrightarrow{Br_2/KOH} \text{Product}$

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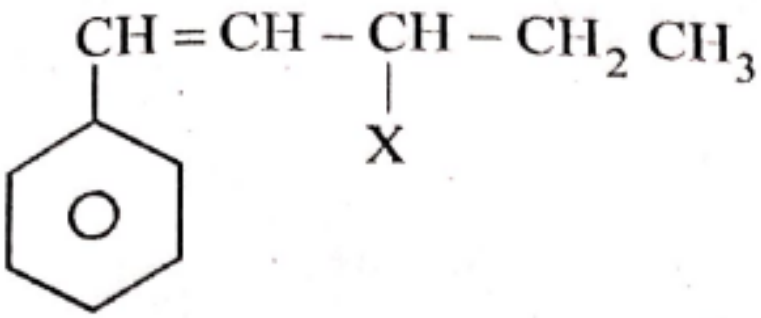
229. The given compound



is an example of _____.

A. aryl halide

B. allylic halide

C. vinclic halide

D. benzylic halide

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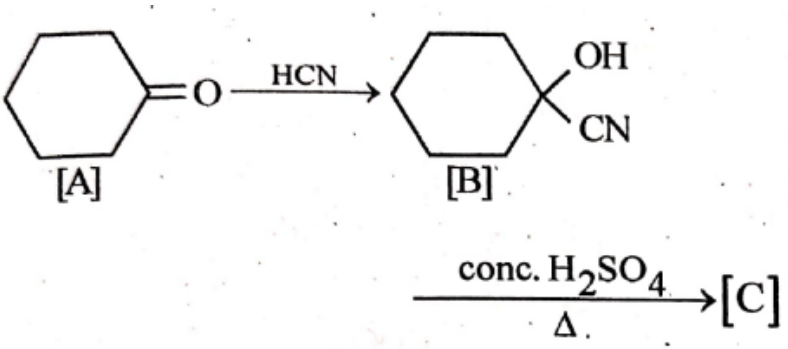
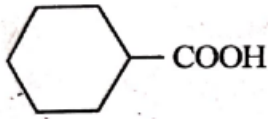
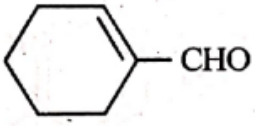
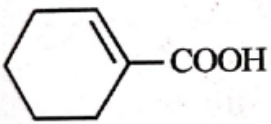
230. Complete the following reaction

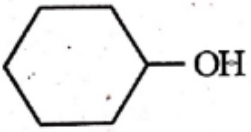


[C] is _____.

A. 

B. 

C. 

D. 

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231. Homoleptic complex from the following complexes is :

A. Diamminechloridoonitrito-N- platinum (II)

B. Pentaamminecar bonatocobalt (III) chloride

C. Triamminetriaquachromium (III) chloride

D. Potassium trixalatoluminate (III)

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232. Weight (g) of two moles of the organic compound ,which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is

A. 32

B. 30

C. 18

D. 16

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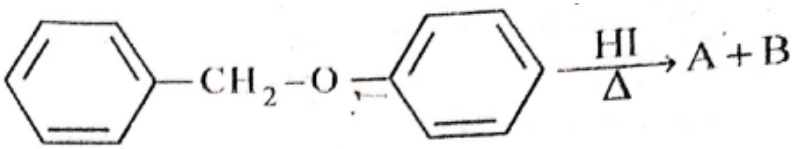
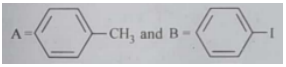
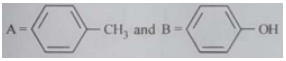
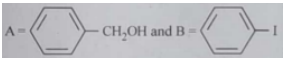
233. Consider the following reaction and identify the product (P).

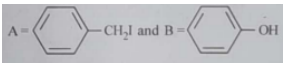


Identify products A and B .

A. 

B. 

C. 

D. 

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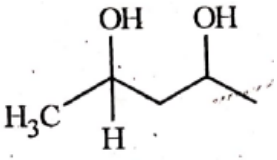
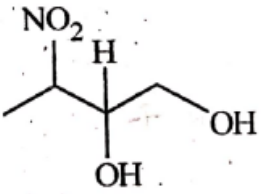
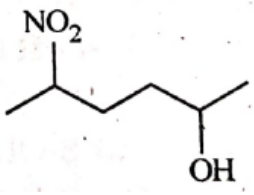
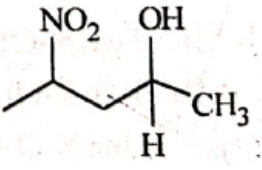
234. Which amongst the following will be most readily dehydrated under acidic conditions?

A. 

B. 

C. 

D. 

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235. The equilibrium concentrations of the species in the reaction $A + B \Leftrightarrow C + D$ are $2, 3, 10$ and $6 molL^{-1}$, respectively at $300K$. ΔG° for the reaction is $(R = 2 \text{cal/mol} K)$

A. $-137.26 cal$

B. -1381.80 cal

C. -13.73 cal

D. 1372.60 cal

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236. Given below are two statements:

Statement I : The nutrient deficient water bodies lead to eutrophication.

Statement II : Eutrophication leads to decrease Inthe level of oxygen in the water bodies.

In the light of the above statements, choose the correct answer from the options given

A. Both Statement I and Statement II are false.

B. Statement I is correct but Statement II is false.

C. Statement I is incorrect but Statement II is true.

D. Both Statement I and Statement II are true.

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237. Which amongst. the following options is the correct relation between change in enthalpy and change in internal energy?

A. $\Delta H = \Delta U + \Delta n_g RT$

B. $\Delta H - \Delta U = - \Delta nRT$

C. $\Delta H + \Delta U = \Delta nR$

D. $\Delta H = \Delta U - \Delta n_g RT$

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238. Match List-I with List-II :

List - I (Oxoacids of Sulphur)	List - II (Bonds)
A. Peroxodisulphuric acid	I. Two S-OH, Four S=O, One S-O-S
B. Sulphuric acid	II. Two S-OH, One S=O
C. Pyrosulphuric acid	III. Two S-OH, Four S=O, One S-O-O-S
D. Sulphurous acid	IV. Two S-OH, Two S=O

Choose the correct answer from the options given below :

A. A-III, B-IV, C-I, D-II

B. A-I, B-III, C-IV, D-II

C. A-III, B-IV, C-II, D-I

D. A-III, B-IV, C-II,D-I

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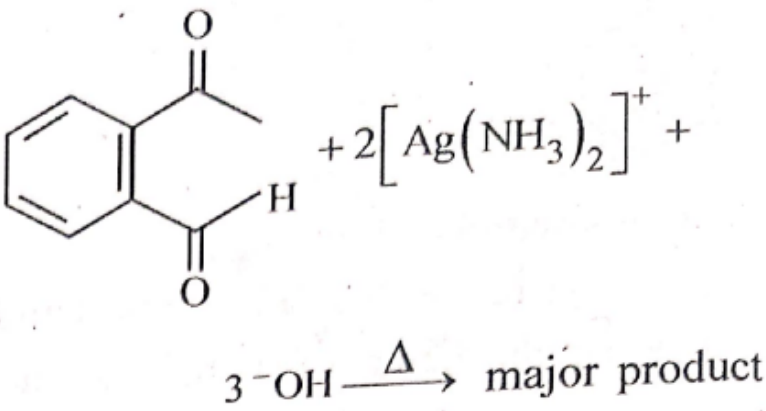
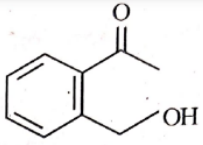
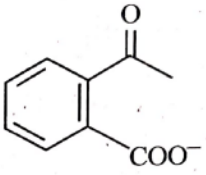
239. Identify the major product obtained in the following reaction :



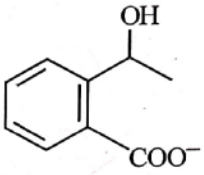
A. (1)



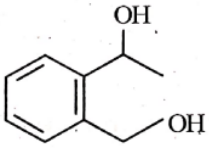
B. (2)



C. (3)



D. (4)



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240. Pumice stone is an example of-

A. gel

B. solid sol

C. foam

D. sol

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241. The reaction that does NOT take place in a blast furnace between 900 K to 1500K temperature range during extraction of iron is :

A. $FeO + CO \rightarrow Fe + CO_2$

B. $C + CO_2 \rightarrow 2CO$

C. $CaO + SiO_2 \rightarrow CaSiO_3$

D. $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$

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242. Which of the following statements are INCORRECT?

A. All the transition metals except scandium form MO oxides which are ionic.

B. The highest oxidation number corresponding to the group number in transition metal oxides is attained in Sc_2O_3 to Mn_2O_7

C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5

D. V_2O_4 dissolves in acids to give VO^{3-} salts.

E. CrO is basic but Cr_2O_3 is amphoteric.

Choose the correct answer from the options given below :

A. B and D only

B. C and D only

C. B and C only

D. A and E only

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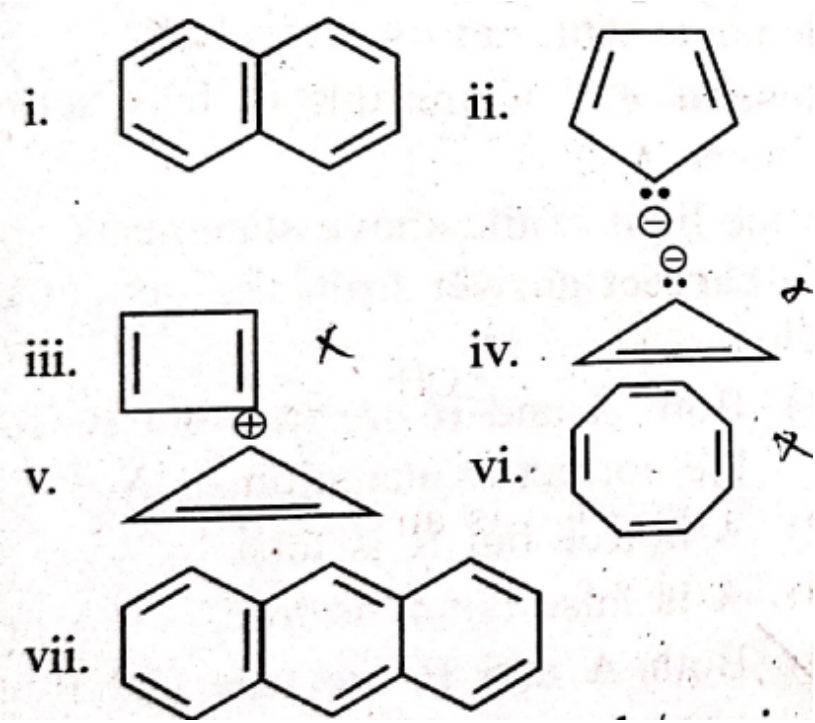
243. Consider the following compounds/species:



The number of compounds/species which obey Huckel's rule is _____

A. 6

B. 2

C. 5

D. 4

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244. What fraction of one edge centred octahedral void lies in one unit cell of fcc ?

A. $\frac{1}{3}$

B. $\frac{1}{4}$

C. $\frac{1}{12}$

D. $\frac{1}{2}$

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245. Which complex compound is most stable ?

A. $\left[Co\left(NH_3\right)_3\left(No_3\right)_3\right]$

B. $\left[CoCl_2(en)_2\right]NO_3$

C. $\left[Co\left(NH_3\right)_6\right]_2\left(SO_4\right)_3$

D. $\left[Co\left(NH_3\right)_4\left(H_2O\right)Br\right]\left(NO_3\right)_2$

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246. O balancing the given redox reaction,

$$aCr_2O_7^{2-} + bSO_3^{2-}(aq) + cH^+(aq) \rightarrow 2aCr^{3+}(aq) + bSO_4^{2-}(aq) + \frac{c}{2}H_2O(l)$$

the coefficients a, b and c are found to be, respectively -

A. 3, 8, 1

B. 1, 8, 3

C. 8, 1, 3

D. 1, 3, 8

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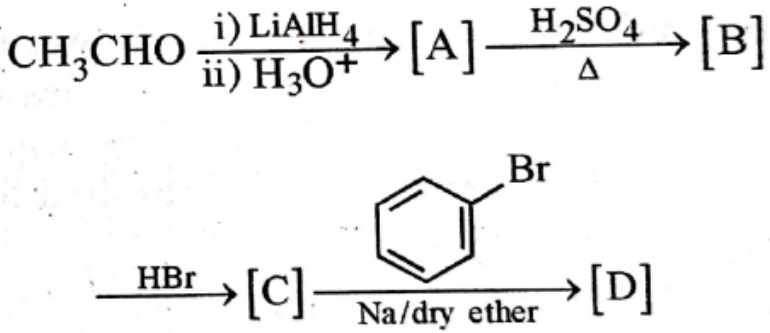
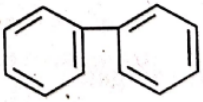
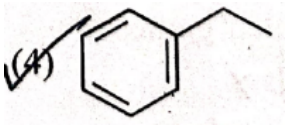
247. Identify the final product [D] obtained in the following sequence of reaction



A. (1) 

B. C_4H_{10}

C. $HC \equiv C^{\Theta} Na^{+}$

D. 

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MCQs

1. Ethyl benzote can be prepared from benzoic acid by using:

A. Ethyl alcohol

B. Ethyl alcohol and dry HCI

C. Ehtyl Chloride

D. Sodium ethoxide

Answer: B

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2. Polarization of electrons in acrolein may be written as:

A. $\overset{+\delta}{CH_2} = CH - \overset{-\delta}{CHO}$

B. $\overset{-\delta}{CH_2} = CH - \overset{+\delta}{CHO}$

C. $\overset{-\delta}{CH_2} = CH - \overset{+\delta}{CHO}$

D. $\overset{+\delta}{CH_2} = CH - \overset{-\delta}{CHO}$

Answer: D

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3. $A \xrightarrow{\text{reduction}} B \xrightarrow[CHCI_3/KOH]{} C \xrightarrow{\text{reduction}}$

N-methyl aniline than A is :

A. 

B. 

C. CH_3NH_2

D. 

Answer: B

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4. First product of the reaction between RCHO and NH_2NH_2 :-

A. $RCH = NNH_2$

B. $RCH = NH$

C. RCH_2NH_2

D. $RCON_2$

Answer: A

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5. In Friedal craft reaction Toluene can be prepared by:

A. $C_6H_6 + CH_3CI$

B. $C_6H_5CI + CH_4$

C. $C_6H_6CH_2CI_2$

D. $C_6H_6 + CH_3COCI$

Answer: A

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6. Which of the following reagents convert the propene to 1-propanol?

A. H_2O, H_2SO_4

B. B_2H_6, H_2O, OH^-

C. $Hg(Oac)_2, NaBH_4/H_2O$

D. $Aq. KOH$

Answer: B

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7. Reduction by $LiAlH_4$ of hydorlysed product of an ester gives:

A. Two alcohols

B. Two aldehyde

C. One acid and one alcohol

D. Two acids

Answer: A

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8. α-D glucose and β-D -glucose are

A. Epimers

B. Anomer

C. Enantiomers

D. Diasteromers

Answer: B

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9. $CF_2 = CF_2$ is a monomer of

A. Teflon

B. Orlon

C. Polythene

D. Nylon-6

Answer: A

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10. Correct order of stability is:

A. 1- butene > Trans-2- butene > Cis -2- butene

B. Trans-2-butene > 1-butene > cis-2-butene

C. Trans-2-butene > cis--2-butene > 1-butene

D. Cis-2-butene > Trans-2-butene > 1 butene

Answer: C

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11. 2-butene shows geometrical isomerism due to:

A. Restricted rotation about double bond

B. Free rotation about double bond

C. free rotation about single bond

D. Chiral carbon

Answer: A

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12. The dihedral angle between the hydrogen atoms of two methyl groups in staggered conformation of ethane is

A. 0°

B. 120°

C. 60°

D. 180°

Answer: C

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13. Which one is responsible for produce energy in bio reaction:

A. Thyroxine

B. Adrenelene

C. Oestrogen

D. Projestrone

Answer: A

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14. Which of the following expressions correctly represents the relationship between the average molar kinetic energies (KE) of CO and N_2 molecules at the same temperature?

A. $KE_1 = KE_2$

B. $KE_1 > KE_2$

C. $KE_1 < KE_2$

D. $KE_1 < KE_2$

Answer: A

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15. For given enegy, corresponding wavelength will be $E = 3.03 \times 10^{-19}$ Joules $\left(h = 6.6 \times 10^{-34} jX \text{ sec.}, C = 3 \times 10^{8} \text{ m/sec}\right.$

A. 65.3 nm.

B. 6.53 nm

C. 3.4 nm

D. 653 nm

Answer: D

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16. Equilibrium constant Kp for following reaction:

$MgCO_3(s) \Leftrightarrow MgO(s) + CO_2(g)$

A. $Kp = P_{CO_2}$

B. $Kp = P_{CO_2} \times \frac{P_{C_2} \times P_{MgO}}{P_{MgCO_3}}$

C. $Kp = \frac{P_{CO_3} + P_{MgO}}{P_{MgCO_3}}$

D. $Kp = \frac{P_{MgCO_3}}{P_{CO_2} \times P_{MgO}}$

Answer: A

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17. Correct relation b/w dissociation constant's of a di-basci acid:

A. $Ka_1 = Ka_2$

B. $Ka_1 > Ka_2$

C. $Ka_1 < Ka_2$

D. $Ka_1 = \frac{1}{Ka_2}$

Answer: B

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18. For a nay reversible reaction. If increases concetration of reactants. Then effect on equilibruim constant:

A. Depend's on amount of concentration

B. Unchanges

C. Decreases

D. Increase

Answer: B

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19. A compound formed by elements A and B crystallises in a cubic structure where A atoms are present at the corners of a cube and the B atoms are present at the face centres.The formula of the compound is

A. AB

B. AB_3

C. A_2B_2

D. A_2B_3

Answer: B

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20. In quantitative analysis of second group in laboratory, H_2S gas is passed in acidic medium for precipitation. When Cu^{2+} and Cd^{2+} react with KCN, then for product true statement is

A. $K_2\left[Cu(CN)_4\right]$- More stable

$K_2\left[Cd(CN)_4\right]$- Less stable

B. $K_2\left[Cu(CN)_4\right]$-Less stable

$K_2\left[Cd(CN)_4\right]$More stable

C. $K_3\left[Cu(CN)_4\right]$-More stable

$K_2\left[Cd(CN)_4\right]$-less stable

D. $K_3\left[CU(Cu)_4\right]$- Less stable

$K_3\left[Cd(CN)_4\right]$ More stable

Answer: C

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21. The conjugate acid of $\overset{\Theta}{NH_2}$ is

A. NH_4OH

B. NH_4^+

C. NH^{-2}

D. NH_3

Answer: D

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22. Which statement is wrong about pH and H^+

A. pH of neutral water does not zero

B. Adding1N. 1N sol^n of CH_3COOH and NaOH pH will be seven

C. pH of dilute and hot H_2SO_4 is more than concentrate and cold H_2SO_4

D. Mixing solution of CH_2COOH and HCI pH will be less than 7

Answer: B

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23. A 300 gram radioactive sample has life of 3 hour's After 18 hour's remaining quantity will be:

A. 4.68 gram

B. 2.34 gram

C. 3.34 gram

D. 9.37 gram

Answer: A

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24. Which of the following is an electron-deficient compound?

A. $BeCI_2$

B. BCI_3

C. CCI_3

D. PCI_3

Answer: B

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25. $d\pi = p\pi$ bond present in:

A. CO_3^2

B. CO_4^3

C. NO_3

D. NO_2^-

Answer: B

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26. Which statement is wrong:

A. Bond energy of $F_2 > CI_2$

B. Electronegatively of $F > CI$

C. F is more oxidising than CI

D. Electron affinity of $CI > F$

Answer: A

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27. Which compound form linear polymer due to H-bond

A. H_2O

B. NH_3

C. Hbr

D. HCI

Answer: B

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28. Shape of $Fe(CO)_5$ is

A. Octahedral

B. Square planar

C. Trigonal bipyramidal

D. Square pyramidal

Answer: C

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29. Correct order of dissociation energy of N_2 and N_2^+ is:

A. $N_2 > N_2^+$

B. $N_2 = N_2^+$

C. $N_2^+ > N_2$

D. None

Answer: A

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30. Isoelectronic species are:

A. $CO, CN^{-}, NO^{+}, C_2^{-2}$

B. CO^{-}, CN, NO, C_2^{-}

C. CO^{-}, CN^{+}, NO, C_2

D. CO, CN, NO, C_2

Answer: A

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31. Which ion is colourless:

A. Cr^{+4}

B. Sc^{+3}

C. Ti^{+3}

D. V^{+3}

Answer: B

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32. Mg is present in :

A. ChloroCHEl

B. Haemoglobin

C. Vitamin-12

D. Vitamin-B

Answer: A

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33. Which of the following element exhibits maximum oxidation state

A. Cr

B. Mn

C. Fe

D. V

Answer: B

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34. Which of the following statement is correct for the stablity of ions of ethyl alcohol and phenol:

A. Delocalisation of π-electrons in phenoxide ion

B. Delocalisation of electrons in ethoxide ion

C. Inductive effect of ethyl and phenyl group

D. Localisation of π-electrons in phenoxide ion

Answer: A

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35. Which compound has planar structure:

A. XeF_4

B. $XeOF_2$

C. XeO_2F_2

D. XeO_4

Answer: A

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36. Which complex compound will give four isomers:

A. $\left[Fe(en)_3\right]CI_3$

B. $\left[Co(en)_2Cl_2\right]CI$

C. $\left[Fe\left(PPh_3\right)_3NH_3CIBr\right]CI$

D. $\left[Co\left(PPh_3\right)_3CI\right]CI_3$

Answer: C

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37. Which species does not exhibits paramagnetism:

A. N_2^+

B. O_2^-

C. CO

D. NO

Answer: C

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38. For the disproportion of copper:

$2Cu^+ \rightarrow Cu^{+2} + CuE^0$ is :- Given E^0 for Cu^{+2}/Cu is 0.34 V & E^0 for Cu^{+2}/Cu^+ is 0.15 V:

A. 0.49 V

B. $-0.19V$

C. 0.38 V

D. $-0.38V$

Answer: C

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39. Cell reactiomn is spontaneous when

A. ΔG° is negative

B. ΔG° is positive

C. $\Delta E^\circ_{\text{Red}}$ is positive

D. $\Delta E^\circ_{\text{Red}}$ is negative

Answer: A

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40. At inifnite dilution equivalent conductances of Ba^{+2} & CI^{-} ions are 127 & 76 $ohm^{-1}cm^{-1}eq^{-1}$ respectively. Equivalent conductance of $BaCI_2$ at infinate dilutions is:

A. 139.5

B. 101.5

C. 203

D. 279

Answer: A

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41. $2Zn + O_2 \rightarrow 2ZnO, \quad \Delta G^{\circ} = -606J \ldots$ (i)

$2Zn + 2S \rightarrow 2ZnS, \quad \Delta G^{\circ} = -293J \ldots$(ii)

$2S + 2O_2 \rightarrow 2SO_2(g), \quad \Delta G^{\circ} = -408J \ldots$ (iii)

ΔG° for the following reaction

$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

would be:

A. $-731J$

B. $-1317J$

C. $-501J$

D. $+731J$

Answer: A

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42. At $27^\circ C$ latent heat of fusion of a compound is 2930 j/mol. Entropy change is:

A. 9.77 J/mol-K

B. 10.77 J/mol-K

C. 9.07 J/mol-K

D. 0.977 J/mol-K

Answer: A

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43. For the reaction $C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$ which one is true:

A. $\Delta H = \Delta E - RT$

B. $\Delta H = \Delta E + RT$

C. $\Delta H = \Delta E + 2RT$

D. $\Delta H = \Delta H - 2RT$

Answer: A

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44. For the reaction $H^+ + BrO_3^- + 3Br^- \rightarrow 5Br_2 + H_2O$ which of the following relation correctly represents the consumption & formation of reactants and products:

A. $\frac{d[Br^-]}{dt} = -\frac{3}{5}\frac{d[Br_2]}{dt}$

B. $\frac{d[Br^-]}{dt} = -\frac{3}{5}\frac{d[Br_2]}{dt}$

C. $\frac{d[Br^-]}{dt} = -\frac{5}{3}\frac{d[Br_2]}{dt}$

D. $\frac{d[Br^-]}{dt} = \frac{5}{3}\frac{d[Br_2]}{dt}$

Answer: A

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45. From the colligative properties of solution which one is the best method for the determination of mol.wt of proteins & polymers:

A. Osmotic pressure

B. Lowering in V.P

C. Lowering is freezing point

D. Elevation in B.Pt

Answer: A

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46. Which one of the following method is commonly used method for destruction of colloid:

A. Dialysis

B. condensation

C. Filteration by animal membrane

D. By adding electrolyte

Answer: D

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47. Assuming full decomposition, the volume of CO_2 released at STP on heating 9.85 g of $BaCO_3$ (At mass Ba = 137) will be

A. 2.24 lit.

B. 1.12 lit

C. 0.84 lit

D. 0.56 lit

Answer: B

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48. A compound contains three elements A, B and C, if the oxidation number of $A = +2B = +5$ and $C = -2$ then possible formula of the compound is

A. $A_2\left(BC_2\right)_2$

B. $A_3\left(BC_4\right)_2$

C. $A_2\left(BC_3\right)_2$

D. $A_3\left(B_2C\right)_2$

Answer: B

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49. R and S paris of enantiomers differ form one another in

A. Rotation of PPl

B. Solubility in achiral solvent

C. Chemical properties

D. Dipole moment

Answer: A

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50. CH_3 - CH_2 - C | $ClHCH_3$ obtained by chlorination of n butane, will be : -

A. Meso form

B. Racemic mixture

C. d-form

D. l-form

Answer: B

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51. Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3C | | OCH_3 ?

A. 

B. $CH_3CH_2CH = CHCH_2CH_3$

C. $CH_3CH_2CH_2 = CHCH_3$

D. $CH_3 - C(CH_3) = CHCH_3$

Answer: A

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52. The intermediates formed during the reaction of $R - \overset{O}{\overset{||}{C}} - NH_2$ with Br_2 and KOH are :

A. RCONHBr and RNCO

B. RNHCOBr and RNCO

C. RNH-Br and RCONHBr

D. $RCONBr_2$

Answer: A

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53. An organic compound $A\left(C_4H_6CI\right)$ on reation withNa/diethyl ether gives a hydrocarbon which on monochlorination gives only one chloro derivative A is .

A. t-butyl chloride

B. sec. butyl chloride

C. Iso butyl chloride

D. n-butyl chloride

Answer: A

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54. Which of the following is incorrect : -

A. $FeCl_3$ is used in detection of phenol

B. Fehling solution is used in detection of glucose

C. Tollen reagent is used in detection of unsaturation

D. $NaHSO_3$ is used in detection of carbonyl compound

Answer: C

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55. Which of following give positive Fehling solution test

A. Sucrose

B. Glucose

C. Fats

D. Protein

Answer: B

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56. Which of the following is not correctly matched

A. 

B. 

C. 

D. 

Answer: C

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57. Which of the following is correct : -

A. Cyclo heptane is an aromatic compound

B. Diastase is an enzyme

C. Acetophenone is an ether

D. All the above

Answer: B

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58. The incorrect IUPAC name is

A. $CH_3 - C(=O) - CH(CH_3) - CH_3$ 2-methyl-3-butanone

$CH_3 - CH - CH - CH_3$ 2,3-dimethyl pentane

B. $\begin{matrix} | & | \\ CH_3 & CH_2 - CH_3 \end{matrix}$

C. $CH_3 - C \equiv CCH(CH_3)_2$ 4-methyl-2-pentyne

D. $CH_3 - C(Cl)H - C(Br)H - CH_3$ 2-bromo-3-chloro butane

Answer: A

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59. In the preparation of alkene from alcohol using Al_2O_3, which is effective factor?

A. Porousity of Al_2O_3

B. Temperature

C. Concentration

D. Surface area of Al_2O_3

Answer: B

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60. Which of following is correct : -

A. Any aldehyde gives secondary alcohol on reduction

B. Reaction of vegetable oil with H_2SO_4 give glycerin

C. C_2H_5OH, iodine with NaOH gives iodoform

D. Sucrose on reaction with NaCl give invert sugar

Answer: C

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61. Which one the following is correct about H - bonding in nucleotides?

A. A–T G–C

B. A–G T–C

C. G–T A–C

D. A–A T–T

Answer: A

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62. Which is correct statement?

A. Starch is polymer of α-glucose

B. Amylose is a component of cellulose

C. Proteins are composed of only one type of amino acid

D. In cyclic structure of fructose, there are four carbons and one oxygen atom

Answer: A

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63. $-\overset{\overset{O}{||}}{C}-NH-$(peptide bond) which statement is incorrect about peptide bond : -

A. C–N bond length in protiens is longer than usual bond length of N-bond

B. Spectroscopic analysis show planar structure of $-C(=O)-NH-$ group

C. C–N bond length in proteins is smaller than usual bond length of C–N bond

D. None of above

Answer: A

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64. In steam distillation of toluene , the pressure of toluene in vapour is

A. Equal pressure of barometer

B. Less than pressure of barometer

C. Equal to vapour pressure to toluene in simple distillation

D. More than vapour pressure of toluene in simple distillation

Answer: B

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65. A compound with molecular formula C_7H_{16} shows optical isomerism, the compound will be

A. 2, 3-dimethyl pentane

B. 2, 2-dimethyl butane

C. 2-methyl hexane

D. None of the above

Answer: A

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66. Change in enthalpy for reaction $2H_2O_2(l) \rightarrow 2H_2O(l) + O_2(g)$ if heat of formation of $H_2O_2(l)$ and $H_2O(l)$ are -188 and $-286KJ/mol$ respectively is

A. $-196KJ/mol$

B. $+196KJ/mol$

C. $+948KJ/mol$

D. $-948KJ/mol$

Answer: A

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67. When 1 mole of gas is heated at constant volume. Temperature is raised from 298 to $308K$. Heat supplied to the gas is $500J$. Then which stamenet is correct?

A. q = w = 500 J, $\Delta U = 0$

B. q = ΔU = 500J, w = 0

C. q = w = 500 J, $\Delta U = 0$

D. $\Delta U = 0$, q = w = – 500 J

Answer: B

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68. Enthalpy of $CH_4 + \frac{1}{2}O_2 \rightarrow CH_3OH$ is negative. If enthalpy of combustion of CH_4 and CH_3OH are x and y respectively, then which relation is correct?

A. x gt y

B. x lt y

C. x = y

D. $x \leq y$

Answer: B

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69. For the reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$ rate of reaction and rate constant are 1.02×10^{-4} and $3.4 \times 10^{-5}\text{sec}^{-1}$ respectively. The concentration of N_2O_5 at that time will be

A. 1.732

B. 3

C. 1.02×10^{-4}

D. 3.4×10^{5}

Answer: B

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70. A human body required the 0.01 M activity of radioactive substance after 24 h. Half life of radioactive substance is 6h. Then injection of maximum activity of radioactie substance that can be injected will be

A. 0.08

B. 0.04

C. 0.16

D. 0.32

Answer: C

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71. When a biochemical reaction is carried out in laboratory from outside of human body in the absence of enzyme, the rate of reaction obtained is 10^{-6} times, then activation energy of the reaction in the presence of enzyme is

A. $\frac{6}{RT}$

B. P is required

C. Different from, E_a obtained in laboratery

D. Can't say any things

Answer: C

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72. Molarity of liquid HCl with density equal to $1.17 g/mL$ is:

A. 36.5

B. 18.25

C. 32.05

D. 42.10

Answer: C

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73. Percentage of Se in peroxidase anhydrase enzyme is 0.5% by weight (at. Wt. $= 78.4$), then minimum molecular weight of peroxidase anhydrase enzyme is:

A. 1.568×10^4

B. 1.568×10^3

C. 15.68

D. 2.136×10^4

Answer: A

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74. Specific volume of cylindrical virus particle is $6.02 \times 10^{-2} cc/g$ whose radius and length 7Å and 10Å respectively. If $N_A = 6.02 \times 10^{23}$, find molecular weight of virus:

A. 1.54 kg/mol.

B. 1.54×10^4 kg/mol.

C. 3.08×10^4 kg/mol.

D. 3.08×10^3 kg/mol.

Answer: A

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75. Pure water can be obtained from sea water by

A. Centrifugation

B. Plasmolysis

C. Reverse osmosis

D. Sedimentation

Answer: C

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76. Standard electrode potentials are

$Fe^{2+}/Fe, E^{\circ} = -0.44V$

$Fe^{3+}/Fe^{2+}, E^{\circ} = +0.77V$

If Fe^{3+}, Fe^{2+}, and Fe block are kept together, then

A. Fe^{+3} increases

B. Fe^{+3} decreases

C. $\frac{Fe^{+2}}{Fe^{+3}}$ remains unchanged

D. Fe^{+2} decreases

Answer: B

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77. Which is not correct regarding the adsorption of a gas on surface of a solid?

A. On increasing temp. adsorption increase continuously

B. Enthalpy & entropy change is – Ve

C. Adsorption is more for some specific substance

D. Reversible

Answer: A

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78. $PbO_2 \rightarrow PbO, \Delta G_{298} < 0$

$SnO_2 \rightarrow SnO, \Delta G_{298} > 0$

Most proble oxidation states of Pb and Sn will be

A. Pb^{+4}, Sn^{+2}

B. Pb^{+4}, Sn^{+2}

C. Pb^{+2}, Sn^{+2}

D. Pb^{+2}, Sn^{+4}

Answer: D

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79. Which of the following two species in the pair are isostructural : -

A. XeF_2, IF_2^-

B. NH_3, BF_3

C. CO_3^{-2}, SO_3^{-2}

D. PCl_5, ICl_5

Answer: A

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80. In which of the following bond angle is maximum

A. NH_3

B. NH_4^+

C. PCl_3

D. SCl_2

Answer: B

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81. Which of the following statement is not correct?

A. $La(OH)_3$ is less basic than $La(OH)_3$

B. In Lanthanide series ionic radius of $\ln^{+3}$ ions decreases

C. La is actually an element of transition series rather Lanthanide

D. Aomic radius of Zr and Hf are same because of Lanthanide contraction

Answer: A

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82. Correct order of 1st ionisationpotential (IP) among following elements Be, B, C, N, O is

A. B lt Be lt C lt O lt N

B. B lt Be lt C lt N lt O

C. Be lt B lt C lt N lt O

D. Be lt B lt C lt O lt N

Answer: A

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83. Which of the following will give maximum number of isomer ?

A. $\left[Co\left(NH_3\right)_4Cl_2\right]$

B. $\left[Ni(en)\left(NH_3\right)_4\right]^{+2}$

C. $\left[Ni\left(C_2O_4\right)(en)_2\right]^{-2}$

D. $\left[Cr(SCN)_2\left(NH_3\right)_4\right]^{+}$

Answer: D

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84. Coordination number of Ni in $\left[Ni\left(C_2O_4\right)_3\right]^{4-}$ is:

A. 3

B. 6

C. 4

D. 2

Answer: B

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85. Which of the following organometallic compound is a sigma and pi bonded? .

A. $\left[Fe\left(\eta^5 - C_5H_5\right)_2\right]$

B. $K\left[PtCl_3\left(\eta^2 - C_2H_4\right)\right]$

C. $\left[Co(CO)_5NH_3\right]^{+2}$

D. $Fe\left(CH_3\right)_3$

Answer: C

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86. Which statement is incorrect : -

A. $Ni(CO)_4$-Tetrahedral, paramagnetic

B. $Ni(CN)_4^{-2}$-Square planar, diamagnetic

C. $Ni(CO)_4$-Tetrahedral, diamagnetic

D. $\left[Ni(Cl)_4\right]^{-2}$-Tetrahedral, paramagnetic

Answer: A

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87. In X - H----Y , both X and Y are electronegative elements

A. Electro density on X will increase and on H will decrease

B. In both electron density will increase

C. In both electron density will decrease

D. On X electron density will decrease and on H increases

Answer: A

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88. The main axis of diatomic molecule is z. The orbitals p_x and p_y overlap to form

A. π molecular orbtial

B. σ molecular orbtial

C. δ molecular orbtial

D. No bond will form

Answer: A

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89. Which of the following will exhibit maximum ionic conductivity ?

A. $K_4\left[Fe(CN)_6\right]$

B. $\left[Co\left(NH_3\right)_6\right]Cl_3$

C. $\left[Cu\left(NH_3\right)_4\right]Cl_2$

D. $\left[Ni(CO)_4\right]$

Answer: A

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90. For how many orbitals are the quantum numbers $n = 3, l = 2, m = +2$ possible?

A. 1

B. 2

C. 3

D. 4

Answer: A

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91. In $HS^-, I^-, R\text{-}NH_2, NH_3$ order of proton accepting tendency will be

A. $I^- > NH_3 > R\text{-}NH_2 > HS^-$

B. $NH_3 > R\text{-}NH_3 > HS^- > I^-$

C. $RNH_2 > NH_3 > HS^- > I^-$

D. $HS^- > RNH_2 > NH_3 > I^-$

Answer: C

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92. The Beans are cooked earlier in pressure cooker, because : -

A. B.P. increase with increasing pressure

B. B.P. decrease with increasing pressure

C. Extra pressure of pressure cooker, softens the beans

D. Internal energy is not lost while cooking is pressure cooker

Answer: A

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93. The most convenient method to protect the bottom of the ship made of iron is

A. Coating it with Red lead oxide

B. White tin plating

C. Connecting it with Mg block

D. Connecting it with Pb block

Answer: C

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94. *Zn* converts from its melted state to its soilds state, it has hcp structure ,thenfind out the number of nearest atoms.

A. 6

B. 8

C. 12

D. 4

Answer: C

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95. Nitrogen form N_2, but phosphorous form P_2, it's at a time convert in P_4, reason is : -

A. Triple bond present between phosphorous atom

B. $p\pi$ - $p\pi$ bonding is weak

C. $p\pi$ - $p\pi$ bonding is strong

D. Multiple bond form easily

Answer: B

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96. Ionisation constant of CH_3COOH is 1.7×10^{-5} and concentration fo H^+ in certain acetic acid solution is $3.4 \times 10^{-4}M$. The concentration of acetic acid solution is

A. 3.4×10^{-4}

B. 3.4×10^{-3}

C. 6.8×10^{-4}

D. 6.8×10^{-3}

Answer: D

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97. Solubility if M_2S type salt is 3.5×10^{-6}, then find out its solubility product

A. 1.7×10^{-6}

B. 1.7×10^{-16}

C. 1.7×10^{-18}

D. 1.7×10^{-12}

Answer: B

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98. If ${}_{b}X^{a}$ emits firstly a positron, then two α and two β and in the last α is emitted and finally it converts to ${}_{d}^{c}Y$. The correct relation is

A. c = b – 12, d = a – 5

B. a = c – 8, d = b – 1

C. a = c – 6, d = b – 0

D. a = c – 4, a = b – 2

Answer: A

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99. ${}_{92}U^{235}$ nucleus absorbs a neutron and disintegrates into ${}_{54}Xe^{139}$. ${}_{38}Sr^{94}$ and X. What will be the product X ?

A. 3 - neutrons

B. 2 - neutrons

C. α - partical

D. β - partical

Answer: B

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100. In hydrogen atom, energy of first excited state is $-3.4eV$. Then, KE of the same orbit of hydrogen atom is.

A. $+3.4ev$

B. $+6.8eV$

C. $-13.6eV$

D. $+13.6eV$

Answer: A

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101. Reaction $2BaO_2(s) \Leftrightarrow 2BaO(s) + O_2(g), \Delta H = +ve.$ At equilibrium condition, pressure of O_2 is depended on:

A. Increase mass of BaO_2

B. Increase mass of BaO

C. Increase temp. on Eq^m.

D. Increase mass of BaO_2 and BaO both

Answer: C

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102. Solubility of MX_2 type electrolytes is $0.5 \times 10^{-4} mol/L$, then find out K_{sp} of electrolytes.

A. 5×10^{-12}

B. 25×10^{-10}

C. 1×10^{-13}

D. 5×10^{-13}

Answer: D

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103. 2.5 litre of 1 M NaOH solution are mixed with another 3 litre of 0.5 M NaOH solution Then the molarity of the resulting

A. 0.80 M

B. 1.0 M

C. 0.73 M

D. 0.50 M

Answer: C

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104. Which has the highest pH?

A. CH_3COOK

B. Na_2CO_3

C. NH_4Cl

D. $NaNO_3$

Answer: B

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105. Solution of $0.1NNH_4OH$ and $0.1NNH_4Cl$ has $pH9.25$, then find out K_b of NH_4OH.

A. 9.25

B. 4.75

C. 3.75

D. 8.25

Answer: B

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106. Van der Waals real gas acts an ideal gas at which conditions?

A. High temp., Low pressure

B. Low temp., High pressure

C. High temp., High pressure

D. Low temp., Low pressure

Answer: A

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107. The unit of entropy is

A. $JK^{-1}mol^{-1}$

B. $Jmol^{-1}$

C. $J^{-1}K^{-1}mol^{-1}$

D. $JKmol^{-1}$

Answer: A

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108. In a closed insulated container, a liquid is stirred with a paddle to increase the temperature. Which of the following is true?

A. $\Delta E = W \neq 0, q = 0$

B. $\Delta E = W = q \neq 0$

C. $\Delta E = 0, W = q \neq 0$

D. $W = 0 \Delta E = q \neq 0$

Answer: A

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109. 2 mol of an ideal gas at $27^\circ C$ temperature is expanded reversibly from $2L$ to $20L$. Find entropy change $\left(R = 2 cal mol^{-1} K^{-1}\right)$

A. 92.1

B. 0

C. 4

D. 2

Answer: D

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110. Heat of combustion ΔH° for $C(s), H_2(g)$ and $CH_4(g)$ are 94, - 68 and $-213 Kcal/mol$. Then ΔH° for $C(s) + 2H_2(g) \rightarrow \Delta CH_4(g)$ is

A. $-17 Kcal$

B. $-111 Kcal$

C. $-170 Kcal$

D. $-85 Kcal$

Answer: A

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111. If $3A \rightarrow 2B$, then the rate of reaction of $+\frac{dB}{dt}$ is equal to

A. $-\frac{3}{2}\frac{d[A]}{dt}$

B. $-\frac{2}{3}\frac{d[A]}{dt}$

C. $-\frac{1}{3}\frac{d[A]}{dt}$

D. $+2\frac{d[A]}{dt}$

Answer: B

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112. 2A → B + C It would be a zero order reaction when : -

A. The rate of reaction is proportional to square of conc. of A

B. The rate of reaction remains same at any conc. of A

C. The rate remains unchanged at any conc. Of B and C

D. The rate of reaction doubles if conc. of B is increased to double

Answer: B

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113. Which has maximum number of molecules?

A. 7 gm N_2

B. 2 gm H_2

C. 16 gm NO_2

D. 16 gm O_2

Answer: B

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114. A solution contains non-volatile solute of molecular massM_2which of the following can be used to calculate the molecular mass of solute in terms of osmotic pressure?

(m_2 =mass of solute,V=volume of solution,π =osmotic pressure)

A. $M_2 = \left(\frac{m_2}{\pi}\right)VRT$

B. $M_2 = \left(\frac{m_2}{V}\right)\frac{RT}{\pi}$

C. $M_2 = \left(\frac{m_2}{V}\right)\pi RT$

D. $M_2 = \left(\frac{m_2}{V}\right)\frac{\pi}{R}T$

Answer: B

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115. A solution containing components A and B follows Raoult's law, when

A. A – B attraction force is greater than A – A and B – B

B. A – B attraction force is less than A – A and B – B

C. Attraction force remains same in A – A and B – B

D. Volume of solution is different from sum of volume of solute and solvent

Answer: C

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116. Which of the following reaction is not feasible?

A. $2Kl + Br_2 \rightarrow 2KBr + I_2$

B. $2KBr + I_2 \rightarrow 2Kl + Br_2$

C. $2KBr + Cl_2 \rightarrow 2KCl + Br_2$

D. $2H_2O + 2F_2 \rightarrow 4HF + O_2$

Answer: B

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117. In electrolysis of $NaCl$ when Pt electrode is taken H_2 is liberated at cathode while Hg cathode it forms sodium amalgam because

A. Hg is more inert than Pt

B. More voltage is required to reduce H^+ at Hg than at Pt

C. Na is dissolved in Hg while it does not dissolve in Pt

D. Conc. of H^+ ions is larger when Pt electrode is taken

Answer: B

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118. Which of the following statement is true : -

A. Silicon exhibits 4 coordination number in its compound

B. Bond energy of F_2 is less than Cl_2

C. Mn(III) oxidation state is more stable than Mn (II) in aqueous state

D. Elements of 15^{th} gp shows only + 3 and + 5 oxidation states

Answer: B

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119. Which of the following order is wrong-

A. $NH_3 < PH_3 < AsH_3$ -Acidic

B. $Li < Be < B < C$-1st IP

C. $Al_2O_3 < MgO < Na_2O < K_2O$ -Basic

D. $Li^+ < Na^+ < K^+ < Cs^+$ -Ionic radius

Answer: B

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120. General electronic configuration of lanthanides is

A. $(n - 2)f^{1-14}(n - 1)s^2p^6d^{0-1}ns^2$

B. $(n - 2)f^{10-14}(n - 1)d^{0-1}ns^2$

C. $(n - 2)f^{0-14}(n - 1)d^{10}ns^2$

D. $(n - 2)d^{0-1}(n - 1)f^{1-14}ns^2$

Answer: A

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121. An atom has electronic configuration $1s^2 2s^2 2p^6 3s^2 3P^6 3d^3 4s^2$. In which group wouold it be placed ?

A. Fifth

B. Fifteenth

C. Second

D. Third

Answer: A

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122. Which of the following is iso-electronic : -

A. CO_2, NO_2

B. NO_2^-, CO_2

C. CN^-, CO

D. SO_2, CO_2

Answer: C

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123. Which of the following has $p\pi$ - $d\pi$ bonding?

A. NO_3^-

B. SO_3^{-2}

C. BO_3^{-3}

D. CO_3^{-2}

Answer: B

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124. In NO_3^- ion, the number of bond pair and lone pair of electrons on nitrogen atom are:

A. 2, 2

B. 3, 1

C. 1, 3

D. 4, 0

Answer: D

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125. Which of the following shows maximum number of oxidation states :-

A. Cr

B. Fe

C. Mn

D. V

Answer: C

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126. Atomic number of Cr and Fe are respectively 24 and 26, which of the following is paramagnetic with the spin of electron : -

A. $\left[Cr(CO)_6\right]$

B. $\left[Fe(CO)_5\right]$

C. $\left[Fe(CN)_6\right]^{-4}$

D. $\left[Cr\left(NH_3\right)_6\right]^{+3}$

Answer: D

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127. The hypothetical complex chloro diaquatriammine cobalt (II) chloride can be represented as

A. $\left[CoCl\left(NH_3\right)_3\left(H_2O\right)_2\right]Cl_2$

B. $\left[Co\left(NH_3\right)_3\left(H_2O\right)Cl_3\right]$

C. $\left[Co\left(NH_2\right)_3\left(H_2O\right)_2Cl\right]$

D. $\left[Co\left(NH_3\right)_3\left(H_2O\right)_3Cl_3\right]$

Answer: A

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128. In the silver plating of copper, $K\left[Ag(CN)_2\right]$ is used instead of $AgNO_3$. The reason is

A. A thin layer of Ag is formed on Cu

B. More voltage is required

C. Ag^+ ions are completely removed from solution

D. Less availability of Ag^+ ions, as Cu can not displace Ag from $\left[Ag(CN)_2\right]^-$ ion

Answer: D

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129. $CuSO_4$ solution reacts with excess of KCN solution to form:-

A. $K_2\left[Cu(CN)_4\right]$

B. $K_3\left[Cu(CN)_4\right]$

C. $CuCN_2$

D. $Cu\left[KCu(CN)_4\right]$

Answer: B

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130. Position of non-polar and polar parts in micelle is

A. Polar at outer surface but non polar at inner surface

B. Polar at inner surface non polar at outer surface

C. Distributed over all the surface

D. Are present in the surface only

Answer: A

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131. In borax bead test, which compound is formed?

A. Ortho borate

B. Meta borate

C. Double oxide

D. Tetra borate

Answer: B

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132. Zn gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because

A. Zn act as oxidising agent when react with HNO_3

B. HNO_3 is weaker acid then H_2SO_4 & HCl

C. In electrochemical series Zn is above hydrogen

D. NO_3^{Θ} is reduced in prefference to hydronium ion

Answer: D

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133. IUPAC name of the following is $CH_2 = CH - CH_2 - CH_2 - C \equiv CH$

A. 1, 5-hexenyne

B. 1-hexene-5-yne

C. 1-hexyne-5-ene

D. 1, 5-hexynene

Answer: B

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134. n-Propyl alcohol and isopropyl alcohol can be chemically distinguished by which reagent :

A. PCl_5

B. Reduction

C. Oxidation with Potassium dichromate

D. Oznolysis

Answer: C

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135. In the following reaction , product P is $R - C(=O) - Cl \xrightarrow[Pd-BaSO_4]{H_2} P$

A. RCH_2OH

B. $RCOOH$

C. $RCHO$

D. RCH_3

Answer: C

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136. Reactivity order of halides of dehydrohalogenation is

A. R – F gt R – Cl gt R – Br gt R – I

B. R – I gt R – Br gt R – Cl gt R – F

C. R – I gt R – Cl gt R – Br gt R – F

D. R – F gt R – I gt R – Br gt R – Cl

Answer: B

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137. Cellulose is a polymer of

A. Glucose

B. Fructose

C. Ribose

D. Sucrose

Answer: A

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138. When phenol is treated with $CHCl_3$ and $NaOH$, the product fromed is

A. Benzaldehyde

B. Salicylaldehyde

C. Salicylic acid

D. Benzoic acid

Answer: B

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139. An organic compound containing C, H and N have the percentage $40, 13.33$ and 46.67 respectively. Its empirical formula may be:

A. $C_3H_{13}N_3$

B. CH_2N

C. CH_4N

D. CH_6N

Answer: C

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140. Enzymes are made up of

A. Edible proteins

B. Proteins with specific structure

C. Nitrogen containing carbohydrates

D. Carbohydrates

Answer: B

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141. Geometrical isomers differ in

A. Position of functional group

B. Position of atoms

C. Spatial arrangement of atoms

D. Length of carbon chain

Answer: C

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142. When $CH_3CH_2CHCl_2$ is treated with $NaNH_2$, the product formed is

A. $CH_3 - CH = CH_2$

B. $CH_3 - C \equiv CH$

C. 

D. 

Answer: B

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143. Which is not true statement ?

A. α-carbon of α-amino acid is asymmetric

B. All proteins are found in L-form

C. Human body can synthesize all proteins they need

D. At pH = 7 both amino and carboxylic groups exist in ionised form

Answer: B

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144. The ions O^{2-}, F^{-}, Na^{+}, Mg^{2+} and Al^{3+} iso-electronic. Their ionic radii show are

A. A significant increase from

B. A significant decrease from

C. An increase from O^{2-} to F^{-} and then decrease from Na^{+} to Al^{3+}

D. An decrease from O^{2-} to F^{-} and then increase from Na^{+} to Al^{3+}

Answer: B

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145. Which one of the following compounds is not a protoric acid?

A. $B(OH)_3$

B. $PO(OH)_3$

C. $SO(OH)_2$

D. $SO_2(OH)_2$

Answer: A

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146. The value of Planck's constant is $6.63 \times 10^{-34} Js$. The velocity of light is $3.0 \times 10^{8} ms^{-1}$. Which value is closest to the wavelength in nanometers of a quantum of light with frequency $8 \times 10^{15} s^{-1}$?

A. 2×10^{-25}

B. 5×10^{-18}

C. 4×10^{1}

D. 3×10^{7}

Answer: C

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147. Which of the following statement is not correct for sigma and pi-bonds formed between two carbon atoms ?

A. Sigma-bond is stronger than a pi-bond

B. Bond energies of sigma- and pi-bonds are of the order of 264 KJ/mol and 347 KJ/mol, respectively

C. Free rotation of atoms about a sigma bond is allowed but not in case of a pi-bond

D. Sigma-bond determines the direction between carbon atoms but a pi-bond has no primary effect in this regard

Answer: B

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148. The oxidation states of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$, and $S_2O_6^{2-}$ follow the order

A. $S_2O_4^{2-} < SO_3^{2} < S_2O_6^{2-}$

B. $SO_3^{2} < S_2O_4^{2-} < S_2O_6^{2-}$

C. $S_2O_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$

D. $S_2O_6^{2-} < S_2O_4^{2-} < SO_3^{2-}$

Answer: A

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149. The pyknometric density of sodium chloride crystal is $2.165 \times 10^3 kgm^{-3}$ while its X ray density is $2.178 \times 10^3 kgm^{-3}$ the fraction of unoccupied sites in $NaCl$ crystal is

A. 5.96

B. 5.96×10^{-2}

C. 5.96×10^{-4}

D. 5.96×10^{-3}

Answer: D

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150. For the reaction

$C_3H_8(g) + 5O_2 \rightarrow 3CO_3(g) + 4H_2O(l)$

at constant temperature, $\Delta H - \Delta U$ is

A. $+RT$

B. $-3RT$

C. $+3RT$

D. $-RT$

Answer: B

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151. In Haber process 30 litre of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of gaseous mixture under the aforesaid condition in the end ?

A. 20 litres ammonia, 20 litres nitrogen, 20 litres hydrogen

B. 10 litres ammonia, 25 litres nitrogen, 15 litres hydrogen

C. 20 litres ammonia, 10 litres nitrogen, 30 litres hydrogen

D. 20 litres ammonia, 25 litres nitrogen, 15 litres hydrogen

Answer: B

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152. The densities of graphite and diamond at $298K$ are 2.25 and $3.31gcm^{-3}$, respectively. If the standard free energy difference $\left(\Delta G^0\right)$ is equal to $1895Jmol^{-1}$, the pressure at which graphite will be transformed into diamond at $298K$ is

A. 9.92×10^8 Pa

B. 9.92×10^7 Pa

C. 9.92×10^6 Pa

D. 9.92×10^5 Pa

Answer: A

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153. What is the entropy change (in $JK^{-1}mol^{-1}$) when one mole of ice is converted into water at $0\,^{\circ}C$?

(The enthalpy change for the conversion of ice to liquid water is $6.0KJmol^{-1}$ at $0\,^{\circ}C$)

A. 20.13

B. 2.013

C. 2.198

D. 21.98

Answer: D

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154. The reaction quotient Q for :

$N_2(g) + 3H_2(g) \Leftrightarrow 2NH_3(g)$ is given by $Q = \dfrac{[NH_3]^2}{[N_2][H_2]^3}$ The reaction will proceed in backward direction, when :

A. $Q = K_c$

B. $Q < K_c$

C. $Q > K_c$

D. Q=0

Answer: C

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155. The activation energy for a simple chemical reaction $A \rightarrow B$ is E_a in the forward reaction: The activation of the reverse reaction

A. Is negative of E_a

B. Is always less than E_a

C. Can be less than or more than E_a

D. Is always double of E_a.

Answer: C

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156. Which of the following statements is not true :

A. Among halide ions, iodide is the most powerful reducing agent

B. Fluorine is the only halogen that does not show a variable oxidation state

C. HOCl is a stronger acid than HOBr

D. HF is a stronger acid than HCl

Answer: D

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157. The method of zone refining of metals is based on the principle of :

A. Greater mobility of the pure metal than that of the impurity

B. Higher melting point of the impurity than that of the pure metal

C. Greater noble character of the solid metal than that of the impurity

D. Greater solubility of the impurity in the molten state than in the solid

Answer: D

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158. On the bassis of the information available from the reaction $\frac{4}{3}Al + O_2 \rightarrow \frac{2}{3}Al_2O_3. \Delta G = -827 kJ mol^{-1}$ of O_2 the minimum emf required to carry out an electorlysis of Al_2O_3 is $\left(F = 96500 C mol^{-1}\right)$

A. 2.14 V

B. 4.28 V

C. 6.42 V

D. 8.56 V

Answer: A

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159. The reaction $A \rightarrow B$ follows first order kinetics. The time taken for $0.8mol$ of A to produce $0.6mol$ of B is $1hr$. What is the time taken for the conversion of $9.0mol$ of A to Product $0.675mol$ of B ?

A. 1 hour

B. 0.5 hour

C. 0.25 hour

D. 2 hour

Answer: A

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160. The solubility product of AgI at $25^\circ C$ is $1.0 \times 10^{-16} mol^2 L^{-2}$. The solubility of AgI in $10^{-4} N$ solution of KI at $25^\circ C$ is approximately (in $molL^{-1}$)

A. 1.0×10^{-16}

B. 1.0×10^{-12}

C. 1.0×10^{-10}

D. 1.0×10^{-8}

Answer: B

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161. formation of a solution form two components can be considered as

(i) Pure solvent rarr separated solvent molecules, ΔH_1

(ii) Pure solute rarr separated solute molecules, ΔH_2

(iii) separated solvent and solute molecules rarr solution, ΔH_3

Solution so formed will be ideal if

A. $\Delta H_{\text{Soln}} = \Delta H_1 + \Delta H_2 + \Delta H_3$

B. $\Delta H_{\text{Soln}} = \Delta H_1 + \Delta H_2 - \Delta H_3$

C. $\Delta H_{\text{Soln}} = \Delta H_1 - \Delta H_2 - \Delta H_3$

D. $\Delta H_{Soln} = \Delta H_3 - \Delta H_1 - \Delta H_2$

Answer: A

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162. For which one of the following equation is $\Delta H^{\circ}_{reaction}$ equal to ΔH°_{f} for the product ?

A. $N_2(g) + O_3(g) \rightarrow N_2O_3(g)$

B. $CH_4(g) + 2Cl_2(g) \rightarrow CH_2Cl_2(l) + 2HCl(g)$

C. $Xe(g) + 2F_2(g) \rightarrow XeF_4(g)$

D. $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$

Answer: C

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163. Consider these reactions and their corresponding K_s.

$$\frac{1}{2}N_2 + O_2 \rightarrow NO_2 \quad K_1$$

$$2NO_2 \rightarrow 2NO + O_2 \quad K_2$$

$$NOBr \rightarrow NO + \frac{1}{2}Br_2 \quad K_3$$

Express the K value for the reaction below in terms of K_1, K_2 and K_3

$$\frac{1}{2}N_2 + \frac{1}{2}O_2 + \frac{1}{2}Br_2 \rightarrow NOBrK = ?$$

A. $K_1K_1K_3$

B. $\frac{K_1K_2}{K_3}$

C. $\frac{K_1K_3^2}{K_2}$

D. $\frac{K_2K_3^3}{K_1}$

Answer: D

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164. The molar heat capacity of water at constant pressure, C, is $75JK^{-1}mol^{-1}$. When 1.0 kJ of heat is supplied to 100 g water which is free to expand, the increase in temperature of water is :

A. 1.2 K

B. 2.4 K

C. 4.8 K

D. 6.6 K

Answer: B

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165. If the rate of the reaction is equal to the rate constant, the order of the reaction is

A. 0

B. 1

C. 2

D. 3

Answer: A

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166. The temperature dependence of rate constant (k) of a chemical reaction is written in terms of Arrhenius equation, $k = Ae^{-E_a/RT}$) Activation energy $\left(E_a\right)$ of the reaction can be calculate by plotting

A. k vs T

B. $kvs\frac{1}{\log T}$

C. $\log kvs\frac{1}{T}$

D. $\log kvs\frac{1}{\log T}$

Answer: C

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167. In the reaction :

$$CH_3CHO + HCN \rightarrow CH_3CH(OH)CN \xrightarrow{H.OH} CH_3CH(OH)COOH$$

an asymmetric centre is generated. This acid obtained would be :

A. D-isomer

B. L-isomer

C. 50% D + 50% L -isomer

D. 20% D + 80% L -isomer

Answer: C

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168. Which of the following pairs of compounds are enantiomers :

A. 

B. 

C. 

D. 

Answer: A

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169. In a set of the given reactions, acetic acid yielded a product C.

$CH_3COOH + PCl_5 \rightarrow A \xrightarrow{C_6H_6} Anh.AlCl_3 B \xrightarrow{C_2H_5MgBr} \text{ether}' C'$, product C would be

A. $CH_3CH(OH)C_2H_5$

B. $CH_3COC_6H_5$

C. $CH_3CH(OH)C_6H_5$

D. $CH_3 - \overset{C_2H_5}{\underset{|}{C}}(OH)C_6H_5$

Answer: D

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170. The compound $CH_3 - \overset{CH_3}{\underset{|}{C}} = CH - CH_3$ on reaction with $NaIO_4$ in the presence of $KMnO_4$ given :

A. CH_3COCH_3

B. $CH_3COCH_3 + CH_3COOH$

C. $CH_3COCH_3 + CH_3CHO$

D. $CH_3CHO + CO_2$

Answer: B

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171. The emf of a Daniell cell at $298K$ is E_1

$Zn\left|ZnSO_4(0.01M)\right|\left|CuSO_4(1.0M)\right|Cu$

When the concentration of $ZNSO_4$ is $1.0M$ and that of $CuSO_4$ is $0.01M$, the emf changed to E_2. What is the relationship between E_1 and $E(2)$?

A. $E_1 > E_2$

B. $E_1 < E_2$

C. $E_1 = E_2$

D. $E_2 = 0 \neq E_1$

Answer: A

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172. According to the adsorption theory of catalysis, the speed of the reaction increases because

A. The concentration of reactant molecules at the active centers of the catalyst becomes high due to adsorpt

B. In the process of adsorption, the activation energy of the molecules becomes large

C. Adsorption produces heat which increases the speed of the reaction

D. Adsorption lowers the activation energy of the reaction

Answer: C

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173. Which one of the following characteristics of the transition metals is associated with their catalytic activity?

A. High enthalpy of atomization

B. Paramagnetic behaviour

C. Colour of hydrated ions

D. Variable oxidation states

Answer: D

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174. The basic character of the transition metal monoxide follows the order

A. VO gt CrO gt TiO gt FeO

B. CrO gt VO gt FeO gt TiO

C. TiO gt FeO gt VO gt CrO

D. TiO gt VO gt CrO gt FeO

Answer: D

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175. The correct order of ionic radii Y^{3+} , La^{3+} , Eu^{3+} and Lu^{3+} is $(AT.\,No: Y = 39, La = 57, Eu = 63, Lu = 71)$

A. $Y^{3+} < La^{3+} < Eu^{3+} < Lu^{3+}$

B. $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$

C. $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$

D. $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$

Answer: B

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176. According to IUPAC nomenclature sodium nitroprusside is named as

A. Sodium nitroferricyanide

B. Sodium nitroferrocyanide

C. Sodium pentacyanonitrosyl ferrate (II)

D. Sodium pentacyanonitrosyl ferrate (III)

Answer: C

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177. The number of unpaired electrons in the complex ion $\left[CoF_6\right]^{3-}$ is (Atomic no. of $Co = 27$)

A. 2

B. 3

C. 4

D. Zero

Answer: C

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178. Which of the following octahedral complex does not show geometrical isomerism (A and B are monodentate ligands) ?

A. $\left[MA_2B_4\right]$

B. $\left[MA_3B_3\right]$

C. $\left[MA_4B_2\right]$

D. $\left[MA_5B\right]$

Answer: D

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179. Vitamin-B_{12} contains

A. Fe(II)

B. Co(III)

C. Zn(II)

D. Ca(II)

Answer: B

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180. Among the following, which is not the π-bonded organometallic compound

A. $K\left[PtCl_3\left(\eta^2 - C_2H_4\right)\right]$

B. $Fe\left(\eta^5 - C_5H_5\right)_2$

C. $Cr\left(\eta^6 - C_6H_6\right)_2$

D. $\left(CH_3\right)_4Sn$

Answer: D

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181. The radioisotope , tritium $\left({}_1^3H\right)$ has a half-life of 12.3 years. If the initial amount of tritium is 32 mg , how many milligrams of it would remain after 49.2 years ?

A. 1 mg

B. 2 mg

C. 4 mg

D. 8 mg

Answer: B

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182. Which of the following is a free radical substitution reaction?

A. 

B. 

C. 

D. $CH_3CHO + HCN \rightarrow CH_3CH(OH)CN$

Answer: A

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183. When m-chlorobenzaldehyde is treated with $50\,\%\,KOH$ solution, the product (s) obtained is (are)

A. 

B. 

C. 

D. 

Answer: B

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184. The correct order of reactivity towards the electrophilic substitiution of the compounds aniline(I),benzene(II) and nitro-benzene(III) is

A. III gt II gt I

B. II gt III gt I

C. I lt II gt III

D. I gt II gt III

Answer: D

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185. Which of the following orders of acid strength is correct?

A. RCOOH gt ROH gt HOH gt HC $\equiv$ CH

B. RCOOH gt HOH gt ROH gt HC $\equiv$ CH

C. RCOOH gt HOH gt HC $\equiv$ CH gt ROH

D. RCOOH gt HC $\equiv$ CH gt HOH gt ROH

Answer: B

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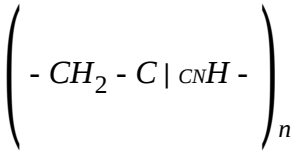
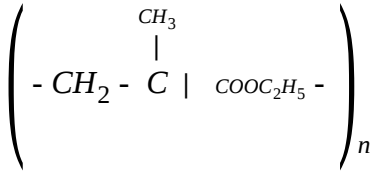
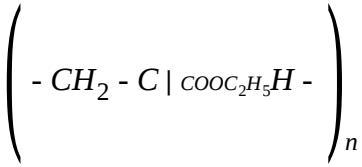
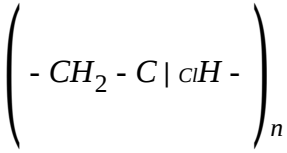
186. Acrilan is a hard, horny and a high melting matrial. Which of the following represent its structure?

A. 

B. 

C. 

D. 

Answer: A

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187. Which one of the following monomers gives the polymer neoprene on polymerization?

A. $CH_2 = CHCl$

B. $CCl_2 = CCl_2$

C. $CH_2 = \overset{Cl}{\underset{|}{C}} - CH = CH_2$

D. $CF_2 = CF_2$

Answer: C

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188. Glycolysis is

A. Oxidation of glucose to glutamate

B. Conversion of pyruvate to citrate

C. Oxidation of glucose to pyruvate

D. Conversion of glucose to haem

Answer: C

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189. Phospholipids are esters of glycerol with

A. Three carboxylic acid residues

B. Two carboxylic acid residues and one phosphate group

C. One carboxylic acid residue and two phosphate groups

D. Three phosphate groups

Answer: B

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190. Chargaff' a rule states that in an organism:

A. Amount of adenine (A) is equal to that of thymine (T) and the amount of guanine (G) is equal to that of cytosine (C)

B. Amount of adenine (A) is equal to that of guanine (G) and the amount of thymine (T) is equal to that of cytosine (C)

C. Amount of adenine (A) is equal to that of cytosine (C) and the amount of thymine (T) is equal to that of guanine (G)

D. Amounts of all bases are equal

Answer: A

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191. Lanthanoids are

A. 14 elements in the seventh period (atomic no. = 90 to 103) that are filling 5f sublevel.

B. 14 elements in the sixth period (atomic no. 58 to 71) that are filling 4f sublevel

C. 14 elements in the seventh period (atomic no. = 58 to 71) that are filling 4f sublevel

D. 14 elements in the sixth period (atomic no. 90 to 103) that are filling 4f sublevel

Answer: B

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192. which of the following forms cationic micelles above certain concentration?

A. sodium acetate

B. Urea

C. Cetyl trimethylammonium chloride

D. Sodium dodecyl sulphonate

Answer: C

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193. Which of the following does not have a metal carbon bond?

A. C_2H_5MgBr

B. $K\left[Pt\left(C_2H_4\right)Cl_3\right]$

C. $Ni(CO)_4$

D. $Al\left(OC_2H_5\right)_3$

Answer: D

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194. Which one of the following is a chain growth polymer?

A. Nucleic acid

B. Polystyrene

C. protein

D. Starch

Answer: B

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195. The correct statement in respect of protein haemoglobin is that it

A. Maintains blood sugar level

B. Acts as an oxygen carrier in the blood

C. Forms antibodies and offers resistance to diseases

D. Functions as a catalyst for biological reactions

Answer: B

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196. A sequence of how many nucleotides in messenger RNA makes a condon for an amino acid

A. Four

B. One

C. Two

D. Three

Answer: D

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197. The hormone that helps in the conversion of glucose into glycogen is:

A. Bile acids

B. Adrenaline

C. insulin

D. Cortisone

Answer: C

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198. Which of the following is considered to be an anticancer species?

A. 

B. 

C. 

D. 

Answer: B

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199. The bond energies of $H--H$, $Br--Br$ and $H--Br$ are $433,,192$ and $364KJmol^{-1}$ respectively. The ΔH° for the reaction

$H_2(g) + Br_2(g) \rightarrow 2HBr(g)$ is

A. $+103KJ$

B. $+261kJ$

C. $-103kJ$

D. $-261kJ$

Answer: C

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200. Which one is responsible for depletion of ozone layer in the upper strata of the atmosphere?

A. Ferrocene

B. Fullerenes

C. Freons

D. Polyhalogens

Answer: C

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201. Among the following the pair in which the two species are not isostructural is

A. IO_3^- and XeO_3

B. BH_4^- and NH_4^+

C. PF_6^- and SF_6

D. SiF_4 and SF_4

Answer: D

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202. The rate of first-order reaction is $1.5 \times 10^{-2} M \min^{-1}$ at $0.5M$ concentration of reactant. The half-life of reaction is

A. 23. 1min

B. 8.73 min

C. 7.53 min

D. 0.383 min

Answer: A

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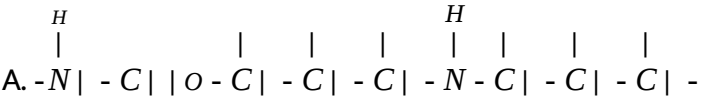
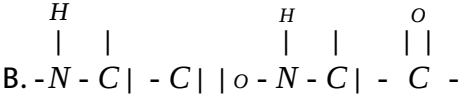
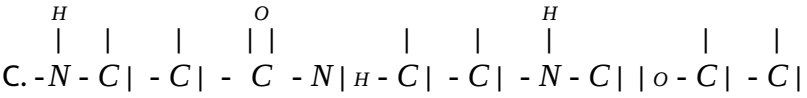
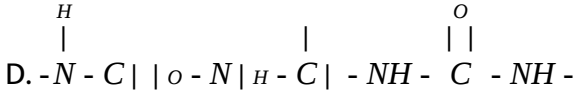
203. Which of the following structures represents the peptide chain?

A.


B.


C.


D. 

Answer: B

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204. Which can be oxidized to the corresponding carbonyl compound?

A. o-Nitrophenol

B. Phenol

C. 2-methyl-2-hydroxy propane

D. 2-hydroxy propane

Answer: D

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205. In an octahedral structure , the pair of d orbitals involved in d^2sp^2 hybridization is

A. $d_{xz}, d_{x^2-y^2}$

B. d_z^2, d_{xz}

C. d_{xy}, d_{yz}

D. $d_{x^2-y^2}, d_z^2$

Answer: D

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206. The frequency of radiaiton emitted when the electron falls form $n = 4$ to $n = 1$ in a hydrogen atom will be (Given ionization enegry of $H = 2.18 \times 10^{-18} J$and $h = 6.625 \times 10^{-34} Js$)

A. $1.03 \times 10^{15} s^{-1}$

B. $1.03 \times 10^{15} s^{-1}$

C. $1.03 \times 10^{15} s^{-1}$

D. $1.03 \times 10^{15} s^{-1}$

Answer: B

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207. Camphor is often used in molecular mass determination because

A. It has a very high cryoscopic constant

B. It is volatile

C. It is solvent for organic substances

D. It is readily available

Answer: A

Watch Video Solution

208. Total number of chiral carbons in β - $D(+)$ glucose is

A. Six

B. Three

C. Four

D. Five

Answer: D

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209. The helical structure of protein is stabilised by:

A. Hydrogen bonds

B. Ether bonds

C. Peptide bonds

D. Dipeptide bonds

Answer: A

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210. Which is least reactive towards nucleophilic substitution $\left(S_{N^2}\right)$

A. $CH_2 = CHCl$

B. CH_3CH_2Cl

C. $CH_2 = CHCH_2Cl$

D. $\left(CH_3\right)_3C$ - Cl

Answer: A

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211. H_2O is dipolar, whereas BeF_2 is not. It is because

A. H_2O involves hydrogen bonding whereas BeF_2 is a discrete molecule

B. H_2O is linear and BeF_2 is angular

C. H_2O is angular and BeF_2 is linear

D. The electronegativity of F is greater than that of O

Answer: C

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212. Considering entropy (S) as a thermodynamics parameter, the criterion for the spontaneity of any process is

A. $\Delta S_{\text{system}} - \Delta S_{\text{surrounding gt 0}}$

B. $\Delta S_{\text{system gt 0}}$ only

C. $\Delta S_{\text{surrondings gt O}}$ only

D. $\Delta S_{\text{system}} + \Delta S_{\text{surrounding gt 0}}$

Answer: D

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213. Ionic radii are

A. Inversely proportional to square of effective nuclear charge

B. Directly proportional to effective nuclear charge

C. Directly proportional to square of effective nuclear charge

D. Inversely proportional to effective nuclear charge

Answer: D

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214. CN^- is a strong field ligand. This is due to the fact that

A. It is a pseudohalide

B. It can accept electrons from metal species

C. It forms high spin complexes with metal species

D. It carries negative charge

Answer: D

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215. Considering H_2O as a weak field ligand, the number of unpaired electrons in $\left[Mn\left(H_2O\right)_6\right]^{2+}$ will be (At. no. of $Mn = 25$)

A. Five

B. Two

C. Four

D. Three

Answer: B

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216. The $-OH$ group of an alcohol or of the $-COOH$ group of a carboxylic acid can be replaced by $-Cl$ using

A. Hypochlorous acid

B. Chlorine

C. Hydrochloric acid

D. Phosphorous pentachloride

Answer: A

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217. Reaction of HBr with propene in the presence of peroxide gives :-

A. 3-bromo propane

B. Allyl bromide

C. n-propyl bromide

D. Isopropyl bromide

Answer: D

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218. Chloropicrin is obtained by the reaction of

A. Nitric acid on chlorobenzene

B. Chlorine on picric acid

C. Nitric acid on chloroform

D. Steam on carbon tetrachloride

Answer: C

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219. Aniline when diazotized in cold and then treated with dimethyl aniline gives a coloured product. Its structure would be

A. 

B. 

C. 

D. 

Answer: C

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220. In a regular octahedral molecule MX_6 the number of X - M - X bonds at 180° is

A. Two

B. Six

C. Four

D. Three

Answer: B

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221. Which is the best description of the behaviour of bromine in the reaction given below

$H_2O + Br_2 \rightarrow HOBr + HBr$

A. Both oxidized and reduced

B. Oxidized only

C. Reduced only

D. Proton acceptor only

Answer: D

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222. The maximum number of molecules is present in

A. 5L of N_2 gas at STP

B. 0.5 g of H_2 gas

C. 10g of O_2 gas

D. 15 L of H_2 gas at STP

Answer: A

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223. A compound formed by elements X and Y crystallises in a cubic structure in which the X atoms are at the corners of a cube and the Y atoms are at the face centres.The formula of the compound is

A. X_3Y

B. XY

C. XY_2

D. XY_3

Answer: D

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224. The radioactive isotope $^{60}_{27}Co$ which is used in the treatment of cancer can be made by (n,p) reaction. For this reaction the target nucleus is

A. $._{27}^{59}Co$

B. $._{28}^{60}Ni$

C. $._{27}^{60}Co$

D. $._{28}^{59}Ni$

Answer: D

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225. The enzyme which hydrolyses triglycerides to fatty acid and glycerol is called:

A. Lipase

B. Zymase

C. Pepsin

D. Maltase

Answer: B

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226. Standard enthalpy and standard entropy changes for the oxidation of ammonia at $298K$ are $-382.64kJmol^{-1}$ and $-145.6jK^{-1}mol^{-1}$ respectively. Standard Gibbs energy change for the same reaction at $298K$ is

A. -339.3kJ mol^{-1}

B. -439.3kJ mol^{-1}

C. -523.2kJ mol^{-1}

D. -221.1kJ mol^{-1}

Answer: A

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227. The solubility product of a sparingly soluble salt AX_2 is 3.2×10^{-11}. Its solubility (in mo/L) is

A. 3.1×10^{-4}

B. 2×10^{-4}

C. 4×10^{-4}

D. 5.6×10^{-6}

Answer: A

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228. Among K, Ca, Fe and Zn the element which can form more than one binary compound with chlorine is

A. Zn

B. K

C. Ca

D. Fe

Answer: B

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229. The standard emf of a galvanic cell involving cell reaction with $n = 2$ is found to be $0.295V$ at $25^\circ C$. The equilibrium constant of the reaction would be (Given$F = 96,500 Cmol^{-1}, R = 8.314 JK^{-1}mol^{-1}$):

A. 4.0×10^{12}

B. 1.0×10^{2}

C. 1.0×10^{10}

D. 2.0×10^{11}

Answer: D

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230. Which of the following statements about the zeolites is false?

A. They have open structure which enables them to take up small molecules

B. Zeolites are aluminosilicates having three dimensional network

C. Some of the SiO_4^{4-} units are replaced by AlO_4^{5-} and AlO_4^{4-} ions in zeolites

D. They are used as cation exchangers

Answer: C

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231. Which of the following will not form a yellow precipitate on heating with an alkaline solution of iodine?

A. $CH_3CH_2CH(OH)CH_3$

B. CH_3OH

C. CH_3CH_2OH

D. $CH_3CH(OH)CH_3$

Answer: B

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232. Among $\left[Ni(CO)_4\right]$, $\left[Ni(CN)_4\right]^{2-}$, $\left[NiCl_4\right]^{2-}$ species, the hybridization states at the Ni atom are, respectively (At. no.of $Ni = 28$)

A. sp^3, dsp^2, sp^3

B. sp^3, sp^3, dsp^2

C. dsp^2, sp^3, sp^3

D. sp^3, dsp^2, dsp^2

Answer: A

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233. Among the following series of transition metal ions the one where all meal ions have $3d^2$ electronic configuration is

A. $Ti^+, V^{4+}, Cr^{6+}, Mn^{7+}$

B. $Ti^{4+}, V^{3+}, Cr^{2+}, Mn^{3+}$

C. $Ti^{2+}, V^{3+}, Cr^{4+}, Mn^{5+}$

D. $Ti^{3+}, V^{2+}, Cr^{3+}, Mn^{4+}$

Answer: C

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234. Which of the following coordination compounds would exhibit optical isomerism?

A. Diamminedichloroplatinum (II)

B. Trans-dicyanobis (ethylenediamine) chromium (III) chloride

C. Tris – (ethylenediamine) cobalt (III) bromide

D. Pentaamminenitrocobalt (III) iodide

Answer: C

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235. The rapid change of pH near the stoichiometric point of an acid-base titration is the basic of indicator detection. pH of the solution is related to the ratio of the concentration of conjugate acid ($H \in$) and base $\left(In^{-}\right)$ forms of the indicator by the expression

A. $\log \frac{[\mathrm{Hln}]}{\left[In^{-}\right]} = pK_{\mathrm{In}} - pH$

B. $\log \frac{[\mathrm{Hln}]}{\left[In^{-}\right]} = pH - pK_{\mathrm{In}}$

C. $\log \frac{\left[In^{-}\right]}{[\mathrm{Hln}]} = pH - pK_{\mathrm{In}}$

D. $\log \frac{\left[In^{-}\right]}{[\mathrm{Hln}]} = pK_{\mathrm{In}} - pH$

Answer: A::C

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236. Using anhydrous $AlCl_3$ as catalyst, which one of the following reactions produces ethylbenzene $(PhEt)$?

A. $CH_3 - CH = CH_2 + C_6H_6$

B. $H_2C = CH_2 + C_6H_6$

C. $H_3C - CH_3 + C_6H_6$

D. $H_3C - CH_2OH + C_6H_6$

Answer: B

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237. A solid compound $'X'$ on heating gives CO_2 gas and a residue. The residue mixed with water forms $'Y'$. On passing an excess of CO_2 through $'Y'$ in water, a clear solution, $'Z'$ is obtained. On boiling $'Z'$, compound $'X'$ is reformed. The compound $'X'$ is

A. $CaCO_3$

B. Na_2CO_3

C. K_2CO_3

D. $Ca\left(HCO_3\right)_2$

Answer: A

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238. The work done during the expanision of a gas from a volume of $4dm^3$ to $6dm^3$ against a constant external pressure of 3 atm is (1 L atm = 101.32

J)

A. $-608J$

B. $+304J$

C. $-304J$

D. $-6J$

Answer: A

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239. In BrF_3 molecule, the lone pair occupies equatorial position minimize

A. Bond pair – bond pair repulsion only

B. Lone pair – lone pair repulsion and lone pair– bond pair repulsion

C. Lone pair–lone pair repulsion only

D. Lone pair–bond pair repulsion ony

Answer: B

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240. Which one of the following is an inner orbital complex as well as diamagnetic in nature?

A. $\left[Zn\left(NH_3\right)_6\right]^{2+}$

B. $\left[Ni\left(NH_3\right)_6\right]^{2+}$

C. $\left[Cr\left(NH_3\right)_6\right]^{3+}$

D. $\left[Co\left(NH_3\right)_6\right]^{3+}$

Answer: D

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241. Which one of the following oxides is expected to exhibit paramagnetic behaviour?

A. CO_2

B. ClO_2

C. SO_2

D. SiO_2

Answer: B

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242. The best method for the separation of naphthalene and benzoic acid from their mixture is

A. Sublimation

B. Chromatograpy

C. Crystallisation

D. Distillation

Answer: A

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243. Which one of the following forms micelles in aqueous solution above certain concentration?

A. Glucose

B. Urea

C. Dodecy1 trimetly1 ammonium chloride

D. Pyridinium chloride

Answer: C

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244. The aqueous solution containing which one of the following ions will be colourless

(Atomic number $Sc = 21, Fe = 26, Ri = 22, Mn = 25$)

A. Fe^{2+}

B. Mn^{2+}

C. Ti^{3+}

D. Sc^{3+}

Answer: D

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245. A reaction occurs spontaneously if:

A. $T\Delta S > \Delta H$ and ΔH is +ve and ΔS are -ve

B. $T\Delta S = \Delta H$ and both ΔH and ΔS are +ve

C. $T\Delta S < \Delta H$ and both ΔH and ΔS are +ve

D. $T\Delta S > \Delta H$ and both ΔH and ΔS are +ve

Answer: D

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246. In a face centred cubic lattice unit cell is shared equally by how many unit cells?

A. 4

B. 2

C. 6

D. 8

Answer: C

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247. Which among the following is the most stable carbocation ?

A. $CH_3\overset{+}{C}H_2$

B. $\overset{+}{C}H_3$

C. $CH_3 - \overset{+}{\underset{|}{\overset{CH}{C}}}_{|\,CH}$

D. $CH_3 - \overset{+}{C}H \mid CH$

Answer: C

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248. Equilibrium constants K_1 and K_2 for the following equilibria

$NO(g) + 1/2O_2(g) \overset{K_1}{\Leftrightarrow} NO_2(g)$ and 2NO_(2)(g) overset(K_(2)) (hArr)2NO(g)+O_(2)(g)`

are related as

A. $K_2 = \frac{1}{K_1}$

B. $K_2 = \frac{K_1}{2}$

C. $K_2 = \frac{1}{K_1^2}$

D. $K_2 = K_1^2$

Answer: C

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249. The mole fraction of the solute in one molal aqueous solution is:

A. 0.027

B. 0.036

C. 0.018

D. 0.009

Answer: C

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250. Which one of the following arrangements represents the correct order of electron gain enthalpy of the given atomic species?

A. $F < Cl < O < S$

B. $S < O < Cl < F$

C. $O < S < F < Cl$

D. $Cl < F < S < O$

Answer: C

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251. The vapour pressure of two liquids 'P' and 'Q' are 80 and 60 torr respectively. The total vapour pressure of solution obtained by mixing 3 mole of P and 2 mol of Q would be

A. 68 torr

B. 140 torr

C. 72 torr

D. 20 torr

Answer: C

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252. The mass of carbon anode consumed (giving only carbon dioxide) in the production of $270kg$ of aluminium metal from bauxite by the Hall process is (Atomic mass: $Al = 27$):

A. 90 kg

B. 540 kg

C. 180 kg

D. 270 kg

Answer: A

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253. The absolute enthalpy of neutralization of the reaction,

$MgO(s) + 2HCl(aq.) + H_2O(l)$ will be

A. $57.33kJmol^{-1}$

B. $-57.33kJmol^{-1}$

C. Greater than $= 57.33 KJ mol^{-1}$

D. Less than $= 57.33 KJ mol^{-1}$

Answer: C

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254. Which of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions?

A. 

B. 

C. 

D. 

Answer: B

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255. A solution of urea boils at $100.18\,^{\circ}C$ at the atmospheric pressure. If K_f and K_b for water are 1.86 and $0.512 Kkgmol^{-1}$ respectively, the above solution will freeze at,

A. $-6.54\,^{\circ}C$

B. $-0.654\,^{\circ}C$

C. $6.54\,^{\circ}C$

D. $0.654\,^{\circ}C$

Answer: B

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256. The energy of second Bohr orbit of the hydrogen atom is $-328 kJmol^{-1}$, hence the energy of fourth Bohr orbit would be.

A. $-1312 kJmol^{-1}$

B. $-82 kJmol^{-1}$

C. $-41 kJ mol^{-1}$

D. $-164 kJ mol^{-1}$

Answer: B

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257. The surface tension of which of the following liquid is maximum?

A. C_6H_6

B. H_2O

C. C_2H_5OH

D. CH_3OH

Answer: B

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258. Which one of the following pair represents stereo isomerism :-

A. Linkage isomerism and Geometrical isomerism

B. Chain isomerism and Rotational isomerism

C. Optical isomerism and Geometrical isomerism

D. Structural isomerism and Geometrical isomerism

Answer: C

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259. The number of moles of $KMnO_4$ reduced by $1\text{mol of}KI$ in alkaline medium is

A. One

B. Two

C. Five

D. One fifth

Answer: B

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260. Which of the following undergoes nucleophilic substitution exclusively by S_{N^1} mechanism?

A. Ethyl chloride

B. Isopropyl chloride

C. Benzyl chloride

D. Chlorobenzene

Answer: C

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261. Four successive members of the first row transition elements are listed below with their atomic number. Which one of them is expected to

have the highest third ionisation enthalpy ?

A. Vanadium (Z = 23)

B. Manganese (Z = 25)

C. Chromium (Z = 24)

D. Iron (Z = 26)

Answer: B

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262. Which one of the following is expected to exhibit optical isomerism (en=ethylenediamine)?

A. cis - $\left[Pt\left(NH_3\right)_2Cl_2\right]$

B. cis - $\left[Co(en)_2Cl_2\right]$

C. trans - $\left[Co(en)_2Cl_2\right]$

D. trans - $\left[Pt\left(NH_3\right)_2Cl_2\right]$

Answer: B

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263. A solution has $1:4$ mole ratio of pentane to hexane . The vapour pressure of pure hydrocarbons at $20^\circ C$are 440 mmHgfor pentane and 120mmHg for hexane .The mole

A. 0.200

B. 0.478

C. 0.549

D. 0.786

Answer: B

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264. The rate of reaction between two A and B decreases by factor 4 if the concentration of reactant B is doubled. The order of this reaction with respect to B is

A. 2

B. -1

C. 1

D. -2

Answer: D

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265. Which functional group participates in the disulphide bond formation in proteins?

A. Thioether

B. Thiol

C. Thioester

D. Thiolactone

Answer: B

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266. At $25^{\circ}C$, the dissociation constant of a base. BOH is 1.0×10^{-12}. The concentration of hydroxyl ions in 0.01M aqueous solution of the base would be

A. 1.0×10^{-6} moleL^{-1}

B. 1.0×10^{-7} moleL^{-1}

C. 2.0×10^{-6} moleL^{-1}

D. 1.0×10^{-5} moleL^{-1}

Answer: B

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267. The correct order in which the O-O bond length increases in the following is

A. $O_3 < H_2O_2 < O_2$

B. $O_2 < O_3 < H_2O_3$

C. $O_2 < H_2O_2 < O_3$

D. $H_2O_2 < O_2 < O_3$

Answer: B

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268. Which molecule has trigonal planar geometry ?

A. NH_3

B. BF_3

C. PCl_3

D. IF_3

Answer: B

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269. The main reason for larger number of oxidation states exhibited by the actinoids than the corresponding lanthanoids, is :-

A. Lesser energy difference between 5f and 6d orbitals than between 4f and 5d orbitals

B. More energy difference between 5f and 6d orbitals than between 4f and 5d orbitals

C. Greater reactive nature of the actinoids than the lanthanoids

D. Larger atomic size of actinoids than the lanthanoids

Answer: A

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270. Electrolytic reduction of nitrobenzene in weakly acidic medium gives .

A. Aniline

B. p-Hydroxy aniline

C. N-Phenyl hydroxyl amine

D. Nitroso benzene

Answer: A

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271. Which one of the following compounds is most acidic

A. 

B. 

C. 

D. Cl - CH_2 - CH_2 - OH

Answer: A

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272. For a first-order reaction $A \rightarrow B$ the reaction rate at reactant concentration of $0.10M$ is found to be $2.0 \times 10^{-5} \text{mol} L^{-1} s^{-1}$. The half-life period of the reaction is

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273. The correct relationship between the pH of isomolar solutions of sodium oxide $\left(pH_1\right)$, sodium sulphide $\left(pH_2\right)$, sodium selenide $\left(pH_3\right)$ and sodium telluride $\left(pH_4\right)$ is

A. $pH_1 < pH_2 < pH_3 < pH_4$

B. $pH_1 > pH_2 > pH_3 > pH_4$

C. $pH_1 < pH_2 < pH_3 \approx pH_4$

D. $pH_1 > pH_2 \approx pH_3 < pH_4$

Answer: B

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274. Cell membranes are mainly composed of :

A. Phospholipids

B. Proteins

C. Fats

D. Carbohydrates

Answer: A

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275. A set of reactions yielded a product (D):

$$CH_3COOH \xrightarrow{SOCl_2} (A) \xrightarrow{\text{Benzene}} \underset{anhyd.AlCl_3}{} (B) \xrightarrow{HCN} (C) \xrightarrow{HOH} (D)$$

The structure of (D) would be:

A. 

B. 

C. 

D. 

Answer: A

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276. Which of the following pairs of a chemical reaction is certaion to result a spontaneous reaction ?

A. Endothermic and decreasing disorder

B. Exothermic and increasing disorder

C. Endothermic and increasing disorder

D. Exothermic and decreasing disorder

Answer: B

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277. Products of the following reaction,

$$CH_3 - C \equiv CCH_2CH_3 \xrightarrow[(ii)\,\text{Hydrolysis}]{(i)\,O_3}$$? are:

A. $CH_3COOH + CH_3COCH_3$

B. $CH_3COOH + HOOC.CH_2CH_3$

C. $CH_3CHO + CH_3CH_2CHO$

D. $CH_3COOH + CO_2$

Answer: B

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278. Which of the following would have permanent dipple moment ?

A. BF_3

B. SF_4

C. SiF_4

D. XeF_4

Answer: B

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279. The correct sequence of increasing covalent character is represented by

A. $BeCl_2 < NaCl < LiCl$

B. $NaCl < LiCl < BeCl_2$

C. $BeCl_2 < LiCl < NaCl$

D. $LiCl < NaCl < BeCl_2$

Answer: B

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280. IUPAC Name of some compounds are given. Which one is incorrect ?

A. $CH_3 - CH_2 - CH_2 - CH(CH_2)(CH_3) - \overset{CH_3}{\overset{|}{CH}} - CH_2 - CH_3$

3 - Methyl-4 - ethyl-heptane

B. $CH_3 - CH(OH) - CH(CH_3) - CH_3$

3 - Methyl-2 - butanol

C. $CH_3 - CH_2 - C(\ )(\ ) - CH_2 - CH(CH_3) - CH_3$

2 - Ethyl-3 - methylbut-1 - ene

D. $CH_3 - C \equiv C - CH\left(CH_3\right)_2$

4 - Methyl-2 - pentyne

Answer: A

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281. A nuclide of an alkaine earth metal undergoes radioactive deacy by emission of the α - particles in sucession. The group of the periodic

tablle to which the resulting daughter element would belong to:

A. Gr. 4

B. Gr.6

C. Gr.16

D. Gr.14

Answer: D

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282. $4.5g$ of aluminium (at mass $27u$) is deposited at cathode from Al^{3+} solution by a certain quantity of electric charge. The volume of hydrogen gas produced at STP from H^{+} ions in solution by the same quantity of electric charge will be:

A. $44.8L$

B. 11.2L

C. 22.4L

D. 5.6L

Answer: D

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283. Which of the following is electron deficient molecule ?

A. C_2H_6

B. SiH_4

C. PH_3

D. B_2H_6

Answer: D

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284. H_2S gas when passed through a solution of cations containing HCl precipitates the cations of second group in qualitative analysis but not those belonging to the fourth group. It is because

A. Presence of HCl decreases the sulphide ion concentration

B. Sulphides of group IV cations are unstable in HCl

C. Solubility product of group II sulphides is more than that of group IV sulphides

D. Presence of HCl increases the sulphides ion concentration

Answer: A

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285. The correct order of acid strength is

A. $HClO_4 < HClO_3 < HClO_2 < HClO$

B. $HClO_2 < HClO_3 < HClO_4 < HClO$

C. $HClO_4 < HClO < HClO_2 < HClO_3$

D. $HClO < HClO_2 < HClO_3 < HClO_4$

Answer: D

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286. With which of the following electronic configuration of an atom has the lowest ionization enthalpy:

A. $1s^2 2s^2 2p^6$

B. $1s^2 2s^2 2p^5$

C. $1s^2 2s^2 2p^3$

D. $1s^2 2s^2 2p^5 3s^1$

Answer: D

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287. An element X has the following isotopic composition $.^{200}X: 90\,\%, .^{199}X: 8.0\,\%, .^{202}X: 2\,\%$. The Weighed average atomic mass of naturally occurring element X is closet to

A. 199 amu

B. 200 amu

C. 201 amu

D. 202 amu

Answer: B

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288. Concentrated aqueous sulphuric acid is $98\,\%\, H_2SO_4$ by mass and has a density of $1.80 gmL^{-1}$. Volume of acid required to make one litre of $0.1 M H_2SO_4$ solution is:

A. 5.55 mL

B. 11.10 mL

C. 16.65 mL

D. 22.20 mL

Answer: A

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289. Consider the following sets of quantum numbers.

(i)

n	l	m	s
3	0	0	$+1/2$

(ii)

n	l	m	s
2	2	1	$+1/2$

(iii)

n	l	m	s
4	3	-2	$-1/2$

(iv)

n	l	m	s
1	0	-1	$-1/2$

(v)

n	l	m	s
3	2	3	$+1/2$

Which of the following sets of quantum number is not possible ?

A. a and c

B. b,c and d

C. a,b,c and d

D. b,d and e

Answer: D

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290. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphite ion in acidic solution is

A. 1

B. $\frac{3}{5}$

C. $\frac{4}{5}$

D. $\frac{2}{5}$

Answer: D

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291. In a first-order reaction $A \rightarrow B$, if K is the rate constant and initial concentration of the reactant is $0.5M$, then half-life is

A. $\frac{\ln 2}{k}$

B. $\frac{0.693}{0.5k}$

C. $\frac{\log 2}{k}$

D. $\frac{\log 2}{k\sqrt{0.5}}$

Answer: A

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292. The reaction obey I order with respect to H_2 and ICl both.

$$H_2(g) + 2ICl(g) \rightarrow 2HCl(g) + I_2(g)$$

Which of the following mechanism is in consistent with the given fact ?

Mechanism A: $H_2(g) + 2Cl \rightarrow 2HCl(g) + I_2(g)$

Mechanism B: (i) $H_2(g) + ICl(g) \overset{\text{slow}}{\rightarrow} HCl(g) + HI(g)$

(ii) $HI(g) + ICl(g) \rightarrow HCl(g) + I_2$

A. A only

B. B only

C. A and B both

D. Neither A nor B

Answer: B

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293. If 60 % of a first order reaction was completed in 60 minutes, 50 % of the same reaction would be completed in approximately

[log = 4 = 0.60, log 5 = 0.69].

A. 40 minutes

B. 50 minutes

C. 45 minutes

D. 60 minutes

Answer: C

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294. The equivalent constant of the reaction:

$Cu(s) + 2Ag^{+}(aq.) \rightarrow Cu^{2+}(aq.) + 2Ag(s)$

$E^{\circ} = 0.46V$ at $298K$,is:

A. 4.0×10^{15}

B. 2.4×10^{10}

C. 2.0×10^{10}

D. 4.0×10^{10}

Answer: A

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295. 0.5 molar aqueous solution of a weak acid (HX) is 20% ionised. If K_f for water is $1.86 K kg mol^{-1}$, the lowering in freezing point of the solution is

A. $-0.56K$

B. $-1.12K$

C. $0.56k$

D. $0.12k$

Answer: D

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296. The efficiency of a fuel cell is given by:

A. $\frac{\Delta S}{\Delta G}$

B. $\frac{\Delta H}{\Delta G}$

C. $\frac{\Delta G}{\Delta S}$

D. $\frac{\Delta G}{\Delta H}$

Answer: D

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297. Consider the following reactions :

(a) $H^{+}_{(aq)} + OH^{-}_{(aq)} = H_2O_{(l)}, \Delta H = -X_1 \text{kJ mol}^{-1}$

(b) $H_{2(g)} + \frac{1}{2}O_{2(g)} = H_2O_{(l)}, \Delta H = -X_2 \text{kJ mol}^{-1}$

(c) $CO_{2(g)} + H_{2(g)} = CO_{(g)} + H_2O_{(l)} - X_3 \text{kJ mol}^{-1}$

(d) $C_2H_{2(g)} + \frac{5}{2}O_{2(g)} = 2CO_{2(g)} + H_2O_{(l)} + X_4 \text{kJ mol}^{-1}$

Enthalpy of formation of $H_2O_{(l)}$ is :

A. $+X_1 kJmol^{-1}$

B. $-X_2 kJmol^{-1}$

C. $+X_3 kJmol^{-1}$

D. $-X_4 kJmol^{-1}$

Answer: B

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298. Given the bond energies of $H-H$ and $Cl-Cl$ are $430 kJ mol^{-1}$ and $240 kJ mol^{-1}$, respectively, and $\Delta_f H^\circ$ for HCl is $-90 kJ mol^{-1}$. Bond enthalpy of HCl is

A. 245 kJ mol^{-1}

B. 290 kJ mol^{-1}

C. 380 kJ mol^{-1}

D. 425 kJ mol^{-1}

Answer: D

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299. the Langmuir adsorption isotherm is deduced using the assumption.

A. The adsorbed molecules interact with each other

B. The adsorption takes place in multilayer

C. The adsorption sites are equivalent in their ability to adsorb the particle

D. The heat of adsorption varies with coverage

Answer: C

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300. The following equilibria are given by :

$N_2 + 3H_2 \Leftrightarrow 2NH_3, K_1$

$N_2 + O_2 \Leftrightarrow 2NO, K_2$

$H_2 + \frac{1}{2}O_2 \Leftrightarrow H_2O, K_3$

The equilibrium constant of the reaction $2NH_3 + \frac{5}{2}O_2 \Leftrightarrow 2NO + 3H_2O$ in terms of K_1, K_2 and K_3 is

A. $\frac{K_1K_2}{3}$

B. $\frac{K_2K_3^3}{K_1}$

C. $\frac{K_2K_3^2}{K_1}$

D. $\frac{K_2^2K_3}{K_1}$

Answer: B

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301. Calculate the pOH of solution at $25\,^\circ C$ that contains $1 \times 10^{-10} M$ of hydronium ions, i.e., H_3O^+

A. 1.000

B. 7.000

C. 4.000

D. 9.000

Answer: C

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302. A weak acid, HA, has a K_a of 1.00×10^{-5}. If 0.100 mol of the acid is dissolved in 1 L of water, the percentage of the acid dissociated at equilibrium is the closed to

A. $0.100\ \%$

B. $99.0\ \%$

C. $1.00\ \%$

D. $99.9\ \%$

Answer: C

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303. The fraction of total volume occupied by atoms in a simple cube is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{6}$

C. $\frac{\pi}{3\sqrt{2}}$

D. $\frac{\pi}{4\sqrt{2}}$

Answer: B

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304. The correct order of the size is

A. $Ca^{2+} < Ar < K^{+} < Cl^{-} < S^{2-}$

B. $Ca^{2+} < K^{+} < Ar < S^{2-} < Cl^{-}$

C. $Ca^{2+} < K^{+} < Ar < Cl^{-} < S^{2-}$

D. $Ar < Ca^{2+} < K^{+} < Cl^{-} < S^{2-}$

Answer: C

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305. In which of the following pairs, the two species are iso-structural ?

$(a) SO_4^{2-}$ and NO_3^- (b) BF_3 and NF_3

$(c) BrO_3^-$ and XeO_3 (d) SF_4 and XeF_4

A. BrO_3^- and XeO_3

B. SF_4 and XeF_4

C. SO_3^{2-} and NO_3^-

D. BF_3 and NF_3

Answer: A

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306. The correct order of increasig C - O bond length of CO, CO_3^{2-}, CO_2 is

A. $CO < CO_2 < CO_3^{2-}$

B. $CO_2 < CO_3^{2-} < CO$

C. $CO < CO_3^{2-} < CO_2$

D. $CO_3^{2-} < CO_2 < CO$

Answer: A

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307. Which one of the following ionic species has the greatest proton affinity to form stable compound ?

A. I^-

B. HS^-

C. NH_2^-

D. F^-

Answer: C

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308. In which of the following is the hydration energy higher than the lattice energy?

A. $SrSO_4$

B. $BaSO_4$

C. $MgSO_4$

D. $RaSO_4$

Answer: C

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309. Which of the following srtatement above the advantage of masting of sulphide are before reduction is not true?

A. Roasting of the sulphide to the oxide is thermodynamically feasible

B. Carbon and hydrogen are suitable reducting agents for metal sulphides

C. The $\Delta_f G^\theta$ of the sulphide is greater than those for CS2 and H2S

D. The $\Delta_f G^\theta$ is negative for roasting for sulphide ore to oxide

Answer: B

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310. The correct order of increasing thermal stability of $K_2CO_3, MgCO_3, CaCO_3,$ and $BeCO_3$ is

A. $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$

B. $BeCO_3 < MgCO_3 < K_2CO_3 < CaCO_3$

C. $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$

D. $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$

Answer: C

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311. Sulphide ores of metals are usually concentrated by forth floation proces. Which one of the following sulphide ores offers an exception and is conventrated by chemical leaching'

A. Sphalerite

B. Argentite

C. Galena

D. Copper pyrite

Answer: B

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312. Which of the following anions is present in the chain structure of silicates?

A. SiO_4^{4-}

B. $Si_2O_7^{6-}$

C. $\left(Si_2O_5^{2-}\right)_n$

D. $\left(SiO_3^{2-}\right)_n$

Answer: D

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313. Which one of the following orders correctly represents the increasing acid strengths of the given acids:

A. $HOClO_3 < HOClO_2 < HOClO < HOCl$

B. $HOCl < HOClO < HOClO_2 < HOClO_3$

C. $HOClO < HOCl < HOClO_3 < HOClO_2$

D. $HOClO_2 < HOClO_3 < HOClO < HOCl$

Answer: B

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314. Which of the following oxidation states are the most characteristics for lead and tin, respectively?

A. $+2, +2$

B. $+4, +2$

C. $+2, +4$

D. $+4, +4$

Answer: C

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315. Identify the incorrect statement among the following:

A. Shielding power of 4f electrons is quite weak

B. There is a decrease in the radii of the atoms or ions as one proceeds from La to Lu.

C. Lanthanoid contraction is the accumulation of successive shrinkages

D. As a result of lanthanoid contraction, the properties of 4d series of the transition elements have no similarities with the 5d series of elements.

Answer: D

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316. Which of the following ions is the most stable in aqueous solution ?

$(At.\ No.\ Ti = 22, V = 23, Cr = 24, Mn = 25)$

A. Mn^{3+}

B. Cr^{3+}

C. V^{3+}

D. Ti^{3+}

Answer: B

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317. The d-electronic configuration of $Cr^{2+}, Mn^{2+}, Fe^{2+}$ and Ni^{2+} are, $3^4, 3d^5, 3d^6$ and $3d^8$ respectively. Which of the following aqua complexes will exhibit the minimum paramagnetic behavior?

A. $\left[Cr\left(H_2O\right)_6\right]^{2+}$

B. $\left[Mn\left(H_2O\right)_6\right]^{2+}$

C. $\left[Fe\left(H_2O\right)_6\right]^{2+}$

D. $\left[Ni\left(H_2O\right)_6\right]^{2+}$

Answer: D

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318. Which of the following will give a pair of enontiomorphs ?

$en = NH_2CH_2CH_2NH_2$

A. $\left[Pt\left(NH_3\right)_4\right]\left[PtCl_6\right]$

B. $\left[Co\left(NH_3\right)_4Cl_2\right]NO_2$

C. $\left[Cr\left(NH_3\right)_6\right]\left[Co(CN)_6\right]$

D. $\left[Co(en)_2Cl_2\right]Cl$

Answer: D

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319. If $NaCl$ is doped with $10^{-4}mol\,\%$ of $SrCl_2$ the concentration of cation vacancies will be $\left(N_A = 6.02 \times 10^{23}mol^{-1}\right)$

A. $6.02 \times 10^{14}mol^{-1}$

B. $6.02 \times 10^{15}mol^{-1}$

C. $6.02 \times 10^{16} mol^{-1}$

D. $6.02 \times 10^{17} mol^{-1}$

Answer: D

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320. Which of the following presents the correct order of the acidity in the given compounds?

A. $FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

B. $CH_3COOH > BrCH_2COOH > ClCH_2COOH > FCH_2COOH$

C. $FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$

D. $BrCH_2COOHtClCH_2COOH > FCH_2COOH > CH_3COOH$

Answer: A

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321. The product formed in aldol condensation is

A. An alpha, beta unsaturated ester

B. A beta-hydroxy acid

C. A beta-hydroxy aldehyde or a beta-hydroxy ketone

D. An alpha-hydroxy aldehyde or ketone

Answer: C

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322. Hydrocarbons are formed when aldehydes and ketones are reduced with amalgamated zinc and conc. HCI. The reaction is called:

A. Wolff-Kishner Reduction

B. Clemmensen Reduction

C. Cope Reduction

D. Dow Reduction

Answer: B

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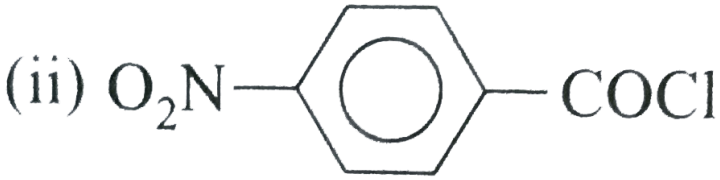
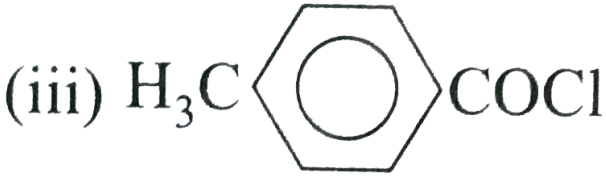
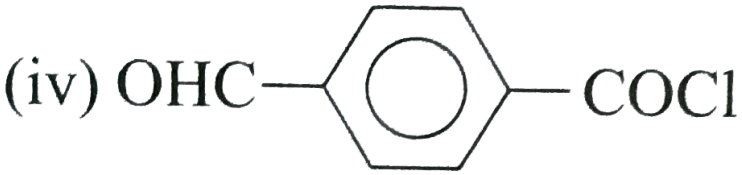
323. The correct decreasing order of their reactivity towards hydrolysis is

(i) C_6H_5COCl

(ii) 

(iii) 

(iv) 

A. $(ii) > (iv) > (i) > (iii)$

B. $(ii) > (iv) > (iii) > (i)$

C. $(i) > (ii) > (iii) > (iv)$

D. $(iv) > (ii) > (i) > (iii)$

Answer: A

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324. Which one of the following on treatment with 50% aqueous sodium hydroxide yields the corresponding alcohol and acid:

A. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_3$

B. $C_6H_5CH_2CHO$

C. C_6H_5CHO

D. $CH_3CH_2CH_2CHO$

Answer: C

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325. Which one of following on reduction with lithium aluminium hydride yields a secondary amine ? .

A. Methyl Cyanide

B. Nitroethane

C. Methylisocyanide

D. Acetamide

Answer: C

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326. The order of decreasing reactivity towards an electrphilic reagent for the following,

(i). Benzene

(ii). Toluene.

(iii). Chlorobenzoic acid.

(iv). Phenol. Would.

A. $d > b > a > c$

B. $a > b > c > d$

C. $b > d > a > c$

D. $d > c > b > a$

Answer: A

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327. The product C is

$$CH_3.CH_2.C \equiv CH + HCl \rightarrow B \xrightarrow{HI} C$$

A. $CH_3CH_2 - \overset{I}{\underset{|}{C}}\,|\,Cl - CH_3$

B. $CH_3C\,|\,ClH - CH_2 - CH_2I$

C. $CH_3 - CH_2 - CH_2 - \overset{I}{\underset{|}{C}}\,|\,Cl - H$

D. $CH_3 - CH_2 - \overset{I}{\underset{|}{CH}} - CH_2Cl$

Answer: A

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328. Which of the compounds with molecular formula C_5H_{10}yields acetone on ozonolysis ?

A. 2-Methyl-1-butene

B. 2-Methyl-2-butene

C. 3-Methyl-1-butene

D. Cyclopentane

Answer: B

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329. If there is no rotation of plane polarized light by a compound in a specific solvent, through to be chiral, it may mean that:

A. The compound may be a racemic mixture

B. The compound is certainly a chiral

C. The compound is certainly meso

D. There is no compound in the solvent

Answer: A

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330. For the following

$(i)I^{-}(ii)Cl^{-}(iii)Br^{-}$

the increasing order of nucleophilicity would be:

A. $Br^{-} < Cl^{-}I^{-}$

B. $I^{-} < Br^{-} < Cl^{-}$

C. $Cl^{-} < Br^{-} < I^{-}$

D. $I^{-} < Cl^{-} < Br^{-}$

Answer: C

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331. $CH_3 - CHCl - CH - CH_3$ has a chiral centre. Which one of the following represent its R-configuration?

A. $H - \overset{CH_3}{\underset{|}{C}} | C_2H_5 - Cl$

B. $H_3C - \overset{C_2H_5}{\underset{|}{C}} | H - Cl$

C. $H - \overset{C_2H_5}{\underset{|}{C}} | Cl - CH_3$

D. $Cl - \overset{C_2H_5}{\underset{|}{C}} | H - CH_3$

Answer: D

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332. In the reaction $CH_3 - \overset{CH_3}{\underset{|}{C}} H - CH_2 - O - CH_2 - CH_3 + HI \xrightarrow{\text{Heated}} .....$

Which of the following compounds will be formed ?

A. $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2OH + CH_3 - CH_2 - I$

B. $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - I + CH_3CH_2OH$

C. $CH_3 - CH\,|\,CH_3 - CH_3 + CH_3CH_2OH$

D. $CH_3 - CH\,|\,CH_3 - CH_2OH_CH + CH_3CH_3$

Answer: A

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333. Which one of the following vitamins is water-soluble?

A. Vitamin A

B. Vitamin B

C. Vitamin E

D. Vitamin K

Answer: B

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334. RNA and DNA are chiral molecules, their chirality is due to

A. D-sugar Component

B. L-sugar component

C. Chiral bases

D. Chiral phosphate ester units

Answer: A

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335. Which one of the following polymers is prepared by condensation polymerization?

A. Styrene

B. Nylon-66

C. Teflon

D. Rubber

Answer: B

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336. 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be

A. 1 mol

B. 2 mol

C. 3 mol

D. 4 mol

Answer: D

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337. Oxidation number of P in PO_4^{3-}, of S in SO_4^{2-} and that of $Cr_2O_7^{2-}$ are respectively

A. $+3,\ +6$ and $+6$

B. $+5,\ +6$ and $+6$

C. $+3,\ +6$ and $+5$

D. $+5,\ +3$ and $+6$

Answer: B

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338. Maximum number of electrons in a sub-shell of an atom is determined by the following.

A. $2n^2$

B. 4l+2

C. 2l+2

D. 4l-2

Answer: B

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339. Which of the following is not permissible arrangement of electrons in an atom ?

A. $n = 3, l = 2, m = -3, s = -\frac{1}{2}$

B. $n = 4, l = 0, m = 0, s = -\frac{1}{2}$

C. $n = 5, l = 3, m = 0, s = +\frac{1}{2}$

D. $n = 3, l = 2, m = -3, s = -\frac{1}{2}$

Answer: D

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340. From the following bond energies

H - H bond energy $431.37 kJmol^{-1}$

$C = C$ bond energy $606.10 kJmol^{-1}$

C - C bond energy $336.49 kJmol^{-1}$

C - H bond energy $410.5 kJmol^{-1}$

Enthalpy for the reaction

$$C\begin{vmatrix}H\\H\end{vmatrix}=C\begin{vmatrix}H\\H\end{vmatrix}+H-H\rightarrow H-C\begin{vmatrix}H\\H\end{vmatrix}-C\begin{vmatrix}H\\H\end{vmatrix}-H$$

will be

A. 553.0kJ mol^{-1}

B. 1523.6 kJ mol^{-1}

C. $-243.6\ \text{kJ mol}^{-1}$

D. -120.0kJ mol^{-1}

Answer: D

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341. The ionization constant of ammonium hydroxide is 1.77×10^{-5} at $298K$. Hydrolysis constant of ammonium chloride is

A. 5.65×10^{-12}

B. 5.65×10^{-10}

C. 6.50×10^{-12}

D. 5.65×10^{-13}

Answer: B

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342. Given:

(i) $Cu^{2+} + 2e^{-} \rightarrow Cu, E^{\circ} = 0.337V$

(ii) $Cu^{2+} + e^{-} \rightarrow Cu^{+}, E^{\circ} = 0.153V$

Electrode potential, E° for the reaction, $Cu^{+} + e^{-} \rightarrow Cu$, will be

A. 0.38V

B. 0.52V

C. 0.90 V

D. 0.30V

Answer: B

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343. What is the $\left[OH^{-}\right]$ in the final solution prepared by mixing $20.0mL$ of $0.050MHCl$ with $30.0mL$ of $0.10MBa(OH)_2$?

A. 0.12M

B. 0.10 M

C. 0.40 M

D. 0.0050 M

Answer: B

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344. The energy absorbed by each molecule $\left(A_2\right)$ of a substance is $4.4 \times 10^{-19} J$ and bond energy per molecule is $4.0 \times 10^{-19} J$. The kinetic energy of the molecule per atom will be.

A. 4.0×10^{-20} J

B. $2.0 \times 10^{-10} J$

C. 2.2×10^{-19} J

D. 4×10^{-19} J

Answer: B

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345. For the reaction $N_2 + 3H_2 \rightarrow 2NH_3$, if $\frac{d\left[NH_3\right]}{dt} = 4 \times 10^{-4}$ mol $L^{-1}s^{-1}$, the value of $\frac{-d\left[H_2\right]}{dt}$ would be

A. 1×10^{-4} mol $L^{-1}s^{-1}$

B. $3 \times 10^{-4} molL^{-1}s^{-1}$

C. $4 \times 10^{-4} molL^{-1}s^{-1}$

D. $6 \times 10^{-4} molL^{-1}s^{-1}$

Answer: B

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346. For the reaction $A + B$ products, it is observed that:

(1) on doubling the initial concentration of A only, the rate of reaction is also doubled and

(2) on doubling te initial concentration of both A and B, there is a charge by a factor of 8 in the rate of the reaction.

The rate of this reaction is given by

A. rate = k[A] [B]

B. rate = $k[A]^2[B]$

C. rate = $k[A][B]^2$

D. rate $= k[A]^2[B]^2$

Answer: C

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347. The equivalent conductance of $M/32$ solution of a weak monobasic acid is 8.0 and at infinite dilution is 400. The dissociation constant of this acid is :

A. 1.25×10^{-4}

B. 1.25×10^{-5}

C. 1.25×10^{-6}

D. 6.25×10^{-4}

Answer: B

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348. $0.002m$ aqueous solution of an ionic compound $Co\left(NH_3\right)_5\left(NO_2\right)CI$ freezes at $-0.00732\,^\circ C$.Number of moles of ions which 1 mole of ionic compound produces in water will be $\left(K_f = 1.86\,^\circ C/m\right)$

A. 1

B. 2

C. 3

D. 4

Answer: B

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349. In the reaction

$$BrO^{-3}(aq) + 5Br^{-}(aq) + 6H^{+} \rightarrow 3Br_2(1) + 3H_2O(1)$$

The rate of appearance of bromine $\left(Br_2\right)$ is related to rate of disapperance of bromide ions as folllwoing :

A. $\frac{d\left(Br_2\right)}{dt} = \frac{3}{5}\frac{d\left(Br^-\right)}{dt}$

B. $\frac{d\left(Br_2\right)}{dt} = -\frac{3}{5}\frac{d\left(Br^-\right)}{dt}$

C. $\frac{d\left(Br_2\right)}{dt} = -\frac{5}{3}\frac{d\left(Br^-\right)}{dt}$

D. $\frac{d\left(Br_2\right)}{dt} = \frac{5}{3}\frac{d\left(Br^-\right)}{dt}$

Answer: B

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350. Lithium forms body centred cubic structure. The length of the side of its unit cell is 351 pm. Atomic radius of the lithium will be

A. 300.5 pm

B. 240.8 pm

C. 151.8 pm

D. 75.5 pm

Answer: C

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351. The dissociation constants for acetic acid and HCN at $25^{\circ}C$ are 1.5×10^{-5} and 4.5×10^{-10}, respectively. The equilibrium constant for the equilibirum $CN^{-} + CH_3COOH \Leftrightarrow HCN + CH_3COO^{-}$ would be

A. 3.0×10^{4}

B. 3.0×10^{5}

C. 3.0×10^{-5}

D. 3.0×10^{-4}

Answer: A

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352. The values of ΔH and ΔS for the reaction

$C(\text{graphite}) + CO_2(g) \rightarrow 2CO(g)$ are $170kJ$ and $170JK^{-1}$ respectively. The reaction will be spontaneous at

A. 510 K

B. 170K

C. 910K

D. 1110K

Answer: D

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353. Half-life period of a first-order reaction is 1386 seconds. The specific rate constant of the reaction is

A. $5.0 \times 10^{-2}s^{-1}$

B. $5.0 \times 10^{-3}s^{-1}$

C. $0.5 \times 10^{-2} s^{-1}$

D. $0.5 \times 10^{-3} s^{-1}$

Answer: D

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354. In which of the following molecular/ions BF_2, NO_2^-, NH_2 and H_2O the correct atom is sp^2 hybridized ?

A. BF_3 and NO_2^-

B. NO_2^- and NH_2

C. NH_2^- and H_2O

D. NO_2^- and H_2O

Answer: A

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355. Among the following which is the strongest oxidizing agent ? -

A. Cl_2

B. F_2

C. Br_2

D. I_2

Answer: B

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356. According to MO theory which of thhe following lists makes the nitrogen species in terms of increasing bond order?

A. $N_2^- < N_2^{2-} < N_2$

B. $N_2^- < N_2 < N_2^{2-}$

C. $N_2^{2-} < N_2^- < N_2$

D. $N_2 < N_2^{2-} < N_2^-$

Answer: C

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357. In the case of alkali metals, the covalent character decreases in the order.

A. $MI > MBr > MCl > MF$

B. $MCl > MI > MBr > MF$

C. $MF > MCl > MBr > MI$

D. $MF > MCl > MI > MBr$

Answer: A

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358. Which of the following oxides is not expected to react with sodium hydroxide ?

A. BeO

B. B_2O_3

C. CaO

D. SiO_2

Answer: C

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359. Al_2O_3 is reduced by electrolysis at low potentials and high current. If 4.0×10^4 amperes of currernt is passed through molten Al_2O_3 for 6 hours, what mass of aluminium is produced? (Assume 100 % current efficiency, At. Mass of $Al = 27u$)

A. $1.3 \times 10^4 g$

B. $9.0 \times 10^3 g$

C. $8.1 \times 10^4 g$

D. $2.4 \times 10^5 g$

Answer: C

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360. The stability of $+1$ oxidation state increases in the sequence :

A. $Ga < In < Al < Tl$

B. $Al < Ga < In < Tl$

C. $Tl < In < Ga < Al$

D. $In < Tl < Ga < Al$

Answer: B

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361. Copper crystalline in a face centred cubic lattice with a unit cell length of $361pm$ .What is the radius of copper atom in p m?

A. 108

B. 128

C. 157

D. 181

Answer: B

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362. What is the dominant intermolecular forces or bond that must be overcome in converting liquid CH_3OH to gas ?

A. London dispersion force

B. Hydrogen bonding

C. Dipole-dipole interaction

D. Covalent bonds

Answer: B

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363. Which of the following complexes will mostly likely abosorb visible light ?

(At nos. Sc=21,Ti=22,C=23,Zn=30)

A. $\left[Zn\left(NH_3\right)_6\right]^{2+}$

B. $\left[Sc\left(H_2O\right)_3\left(NH_3\right)_3\right]^{3+}$

C. $\left[Ti(en)_2\left(NH_3\right)_2\right]^{4+}$

D. $\left[Cr\left(NH_3\right)_6\right]^{3+}$

Answer: D

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364. Amongst $\left[TiE_6\right]^{2-}$, $\left[CoF_6\right]^{3-}$, Cu_2Cl_2 and $\left[NiCl_4\right]^{2-}$ [Atomic no. $Ti = 22, Co = 27, Cu = 29, Ni = 28$] the colourless species are :

(A) $\left[TiF_6\right]^{2-}$ and $\left[Cu_2Cl_2\right]$

(B) Cu_2Cl_2 and $\left[NiCl_4\right]^{2-}$

(C) $\left[TiF_6\right]^{2-}$ and $\left[CoF_6\right]^{3-}$

(D) $\left[CoF_6\right]^{3-}$ and $\left[NiCl_4\right]^{2-}$

A. CoF_6^{3-} and $NiCl_4^{2-}$

B. TiF_6^{2-} and CoF_6^{3-}

C. Cu_2Cl_2 and $NiCl_4^{2-}$

D. TiF_6^{2-} and Cu_2Cl_2

Answer: D

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365. Which of the following does not show optical isomerism ?

A. $\left[Co(en)_3\right]^{3+}$

B. $\left[Co(en)_2Cl_2\right]^{+}$

C. $\left[Co\left(NH_3\right)_3Cl_3\right]^0$

D. $\left[Co(en)Cl_2\left(NH_3\right)_2\right]^+$

Answer: C

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366. Which one of the elements with the following outer orbital configuration may exhibit the larger number of oxidation states ?

A. $3d^24s^2$

B. $3d^34s^2$

C. $3d^54s^1$

D. $3d^54s^2$

Answer: D

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367. Which of the following molecules acts as a Lewis acid?

A. $\left(CH_3\right)_3N$

B. $\left(CH_3\right)_3B$

C. $\left(CH_3\right)_2O$

D. $\left(CH_3\right)_3P$

Answer: B

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368. Amongst the following elements (whose electronic configuration an given below) the one having highest ionization energy is

A. $[Ne]3s^23p^1$

B. $[Ne]3s^23p^3$

C. $[Ne]3s^23p^2$

D. $[Ar]3d^{10}4s^24p^3$

Answer: B

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369. The straight chain polymer is formed by

A. hydrolysis of $\left(CH_3\right)_2SiCl_2$ followed by condensation polymerization

B. hydrolysis of $\left(CH_3\right)_2SiCl$ followed by condensation polymerization

C. hydrolysis of CH_3SiCl_3 followed by condensation polymerization

D. hydrolysis of $\left(CH_3\right)_4Si$ followed by condensation polymerization

Answer: A

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370. The *IUPAC* name of the compound having the formula $CH \equiv C - CH = CH_2$ is

A. 1-butene-3-yne

B. 3-buten-1-yne

C. 1-butyn-3-ene

D. but-1-yn-3-ene

Answer: A

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371. Which of the following compounds will exhibit cis-trans (geometrical) isomerism ?

A. 1-Butanol

B. 2-Butene

C. 2-Butanol

D. 2-Butyne

Answer: B

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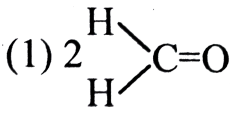
372. CH_2OHCH_2OH on heating with periodic acid gives

A. 

B. $2CO_2$

C. $2HCOOH$

D. $\begin{matrix} CHO \\ | \\ CHO \end{matrix}$

Answer: A

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373. Identify (Z) in the following series.

$$Ethanol \xrightarrow{PBr_3} (X) \xrightarrow{Alc./KOH} (Y) \xrightarrow[(ii)\left(H_2O, Heat\right)]{(i)\,H_2SO_4/\,(\text{Room temp})} (Z)$$

A. CH_3CH_2 - OH

B. $CH_2 = CH_2$

C. CH_3CH_2 - o - CH_2CH_3

D. CH_3CH_2 - O - SO_3H

Answer: A

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374. Benzene reacts with CH_3Cl in the presence of anyhydrous $AlCl_3$ to form

A. Xylene

B. Toluene

C. Chlorobenzene

D. Benzylchloride

Answer: B

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375. Nitrobenzenen can be prepared from benzene by using a mixture of conc HNO_3 and conc. H_2SO_4 in the nitrating mixture. Nitric acid acts as a

A. catalyst

B. reducing agent

C. acid

D. base

Answer: D

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376. Which of the following reactions is an example of nucleophilic substitution reaction?

A. $RX + Mg \rightarrow RMgX$

B. $RX + KOH \rightarrow ROH + KX$

C. $2RK + 2Na \rightarrow R\text{-}R + 2NaX$

D. $RX + H_2 \rightarrow RH + HX$

Answer: B

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377. Which one of the following is employed as a tranquilizer ?

A. Chlorpheninamine

B. Equanil

C. Naproxen

D. Tetracycline

Answer: B

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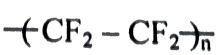
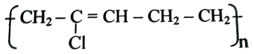
378. Struchures of some common polymers are given. Which one is not correctly represented?

A. (1) Nylon 66

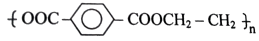
B. (2) Teflon



C. (3) Neoprene



D. (4) Terylene



Answer: C

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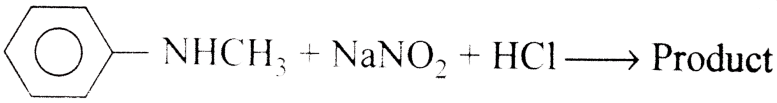
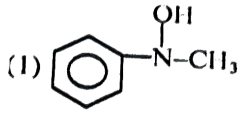
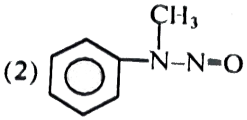
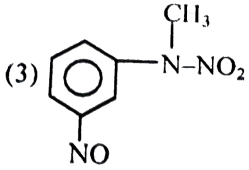
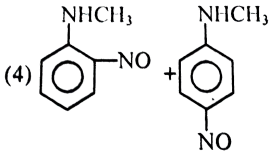
379. Predict the product



A. 

B. 

C. 

D. 

Answer: B

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380. Propionic acid with Br_2/P yields a dibromo product. Its structure would be

A. $CH_3 - \overset{\overset{Br}{|}}{C}_{|\,Br} - COOH$

B. $CH_2Br - CHBr - COOH$

C. $H - \underset{\displaystyle Br}{\overset{\displaystyle Br}{\underset{|}{\overset{|}{C}}}} - CH_2COOH$

D. $CH_3Br - CH_2 - COBr$

Answer: A

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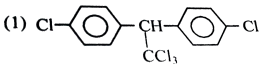
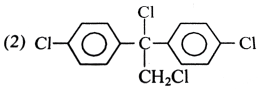
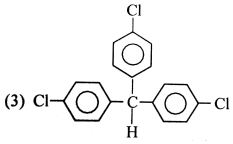
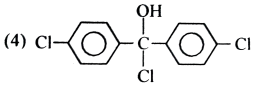
381. Trichloroacetaldehyde, CCl_3CHO reacts with chlorobenzene in presence of sulphuric acid and produces.

A. 

B. 

C. 

D. 

Answer: A

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382. Consider the following reaction

$$\text{Phenol} \xrightarrow{Zn\ \text{dust}} X \xrightarrow[\text{Anhydrous } AlCl_3]{CH_3Cl} Y \xrightarrow{\text{Alkaline } KMnO_4} Z$$

The product Z is

A. Benzene

B. Toluene

C. Benzaldehyde

D. Benzoic acid

Answer: D

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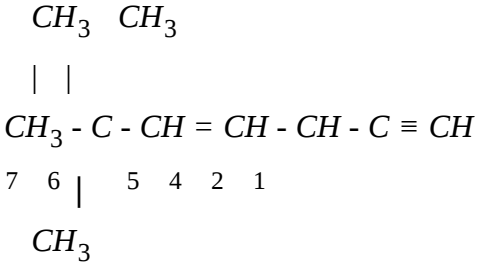
383. The state of hybridisation of C_2, C_3, C_5 and C_6 of the hydrocarbon -



is in the following sequence :

A. sp, sp^2, sp^3 and sp^2

B. sp, sp^3, sp^2 and sp^3

C. sp^3, sp^2, sp^2 and sp

D. sp, sp^2, sp^2 and sp^3

Answer: B

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384. Pure Si at $500K$ has equal number of electron $\left(n_e\right)$ and hole $\left(n_h\right)$ concentration of $1.5 \times 10^{16} m^{-3}$. Dopping by indium. Increases n_h to

$4.5 \times 10^{22} m^{-3}$. The doped semiconductor is of

A. P - type having electron concentrations $n_e = 5 \times 10^{9} m^{-3}$

B. n - Type with electron concentrations $n_e = 5 \times 10^{22} m^{-3}$

C. P - Type with electron concentrations $n_e = 2.5 \times 10^{10} m^{-3}$

D. n - Type with electron concentrations $n_e = 2.5 \times 10^{23} m^{-3}$

Answer: A

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385. The unit of rate constant for zero order reaction is :

A. s^{-1}

B. mol $L^{-1} s^{-1}$

C. $Lmol^{-1} s^{-1}$

D. $L^2 mol^{-2} s^{-1}$

Answer: B

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386. The half life of a substance in a certain enzyme catalyzed reaction is 138s. The time required for the concentration of the substance to fall from $1.28 mgL^{-1} \rightarrow 0.04 mgL^{-1}$:

A. 276 s

B. 414 s

C. 552 s

D. 690 s

Answer: D

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387. Consider the following processes :-

	$\Delta H(kJ/mol)$
$\frac{1}{2}A \rightarrow B$	$+150$
$3B \rightarrow 2C + D$	-125
$E + A \rightarrow 2D$	$+350$

For $B + D \rightarrow E + 2C$, ΔH will be

A. 325 kJ/mol

B. 525 kJ/mol

C. $-175kJ.mol$

D. $-325kJ/mol$

Answer: C

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388. The pairs of species of oxygen and their magnetic behaviour are noted below. Which of the following presents the correct description ?

A. O, O_2^{2-} - Both paramagnetic

B. O_2^-, O_2^{2-} - Both diamagnetic

C. O^+, O_2^{2-} - Both paramagnetic

D. O_2^+, O_2 - Both paramagnetic

Answer: D

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389. According to Bohr theory, which of the following transition in hydrogen atom will give rise to the least energetic proton?

A. n=5 to n=3

B. n=6 to n=1

C. n=5 to n=4

D. n=6 to n=5

Answer: D

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390. In qualitative analysis, the metals of group I can be separated from other ions by precipitating them as chloride salts. A solution initially contains Ag^+ and Pb^+ at a concentration of 0.10M. Aqueous HCl is added to this solution until be Cl^- concentration is 0.10M. What will be concentration of Ag^+ and Pb^{2+} be at equilibrium ?

(K_{sp} for AgCl $= 1.8 \times 10^{-10}$

K_{sp} for $PbCl_2 = 1.7 \times 10^{-5}$)

A. $\left[Ag^+\right] = 1.8 \times 10^{-11}M$,

$\left[Pb^{2+}\right] = 1.7 \times 10^{-4}M$

B. $\left[Ag^+\right] = 1.8 \times 10^{-7}M$,

$\left[Pb^{2+}\right] = 1.7 \times 10^{-6}M$

C. $\left[Ag^+\right] = 1.8 \times 10^{-11}M$,

$\left[Pb^{2+}\right] = 8.5 \times 10^{-5}M$

D. $\left[Ag^+\right] = 1.8 \times 10^{-9}M$,

$\left[Pb^{2+}\right] = 1.7 \times 10^{-3}M$

Answer: D

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391. A bubble of air is underwater at temperature $15\ ^\circ C$ and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is $25\ ^\circ C$ and the pressure is 1.0 bar, what will happen to the volume of the bubble?

A. Volume will become greater by a factor of 2.5

B. Volume will become greater by a factor of 1.6

C. Volume will become greater by a factor of 1.1

D. Volume will become greater by a factor of 0.70

Answer: B

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392. A 0.1 molal aqueous solution of a weak acid is $30\,\%$ ionized. If K_f for water is $1.86\,^\circ C/m$, the freezing point of the solution will be.

A. $-0.24\,^\circ C$

B. $-0.18\,^\circ C$

C. $-0.54\,^\circ C$

D. $-0.36\,^\circ C$

Answer: A

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393. A solution contains Fe^{2+}, Fe^{3+} and T^- ions. This solution was treated with iodine at $35\,^\circ C. E^\circ$ for Fe^{3+}, Fe^{2+} is $0.77V$ and E° for $I_2/2I^-$ = 0.536 V. The favourable redox reaction is:

A. Fe^{2+} will be oxidized to Fe^{3+}

B. I_2 will be the reduced to I^-

C. There will be no redox reaction

D. I^- will be oxidized to I_2

Answer: D

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394. The rate of the reaction

$2N_2O_5 \rightarrow 4NO_2 + O_2$

can be written in three ways:

$$\frac{-d\left[N_2O_5\right]}{dt} = k\left[N_2O_5\right]$$

$$\frac{d\left[NO_2\right]}{dt} = k'\left[N_2O_5\right]$$

$$\frac{d\left[O_2\right]}{dt} = k''\left[N_2O_5\right]$$

The relationship between k and k' and between k and k" are-

A. k' = k, k'' = k

B. k' = 2k, k'' = k

C. $k' = 2k, k'' = \frac{k}{2}$

D. k' = 2k, k'' = 2k

Answer: C

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395. 200 mL of an aqueous solution of a protein contains its 1.26g. The osmotic pressure of this solution at 300K is found to be 2.57×10^{-3} bar. The molar mass of protein will be $\left(R = 0.083 L \bar{m} ol^{-1} K^{-1}\right)$

A. $61038 g mol^{-1}$

B. $51022 g mol^{-1}$

C. $122044 g mol^{-1}$

D. $31011 g mol^{-1}$

Answer: A

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396. Match List I with List II for the compositions of substances and select the correct answer using the code given below the lists-

List-I Substances		List-II Composition	
(A)	Plaster of paris	(i)	$CaSO_4.\ 2H_2O$
(B)	Epsomite	(ii)	$CaSO_4.½H_2O$
(C)	Kieserite	(iii)	$MgSO_4.7H_2O$
(D)	Gypsum	(iv)	$MgSO_4.H_2O$
		(v)	$CaSO_4$

A. $\begin{matrix} A & B & C & D \\ iv & iii & ii & i \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ iii & iv & i & ii \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ ii & iii & iv & i \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ i & ii & iii & v \end{matrix}$

Answer: C

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397. Which of the following oxide is amphoteric?

A. CO_2

B. SnO_2

C. CaO

D. SiO_2

Answer: B

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398. The following reaction take place in the blast in the proparation of impure iron identify the reaction pertatining to the formetion of the slag

A. $2C(s) + O_2(g) \rightarrow 2CO(g)$

B. $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(l) + 3CO_2(g)$

C. $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

D. $CaO(s) + SiO_2(s) \rightarrow CaSiO_3(s)$

Answer: D

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399. Which of the following statements is incorrect?

A. $NaHCO_3$ on heating gives Na_2CO_3

B. Pure sodium metal dissolves in liquid ammonia to give blue solution.

C. NaOH reacts with glass to give sodium silicate

D. Aluminium reacts with excess NaOH to give $Al(OH)_3$

Answer: D

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400. The first ionisation potential of Na is $5.1eV$. The value of eectrons gain enthalpy of Na^+ will be

A. $+10.2eV$

B. $-5.1eV$

C. $-10.2eV$

D. $+2.55eV$

Answer: B

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401. Which has the maximum number of molecules among the following?

A. $64gSO_2$

B. $44gCO_2$

C. $48gO_3$

D. $8gH_2$

Answer: D

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402. A solid compound XY has $NaCl$ structure. If the radius of the cation is 100 pm, the radius of the anion $\left(Y^{-}\right)$ will be

A. 165.7 pm

B. 275.1 pm

C. 322.5 pm

D. 241.5 pm

Answer: D

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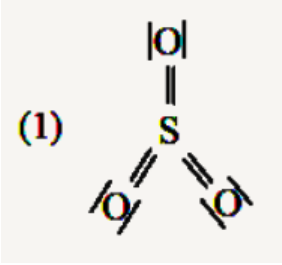
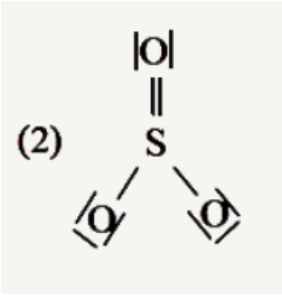
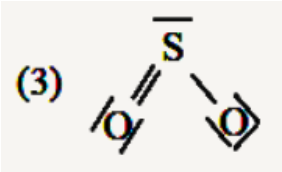
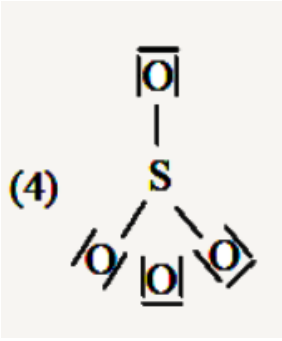
403. Which of the following is a the most preferred and hence of the lower energy for SO_3?

A. 

B. 

C. 

D. 

Answer: A

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404. Which of the following carbonyls will have the strongest C–O bond ?

A. $Fe(CO)_5$

B. $Mn(CO)_6^+$

C. $Cr(CO)_6$

D. $V(CO)_6^-$

Answer: B

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405. Which of the following complex compounds will exhibit highest magnetic behaviour ?

$(At.\ N \odot\ Ti = 22, Cr = 24, Co = 27, Zn = 30)$

A. $\left[Zn\left(NH_3\right)_6\right]^{2+}$

B. $\left[Ti\left(NH_3\right)_6\right]^{3+}$

C. $\left[Cr\left(NH_3\right)_6\right]^{3+}$

D. $\left[Co\left(NH_3\right)_6\right]^{3+}$

Answer: C

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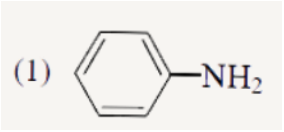
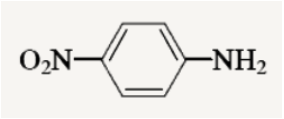
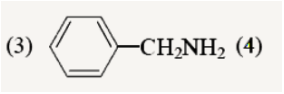
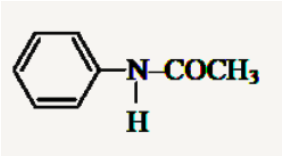
406. Which of the following compounds is most basic?

A. 

B. 

C. 

D. 

Answer: C

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407. Which of the following is not a fat soluble vitamin ?

A. Vitamin A

B. Vitamin B complex

C. Vitamin D

D. Vitamin E

Answer: B

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408. Which of the following compounds undergoes nucleophilic substitution most readly?

A. 

B. 

C. 

D. 

Answer: B

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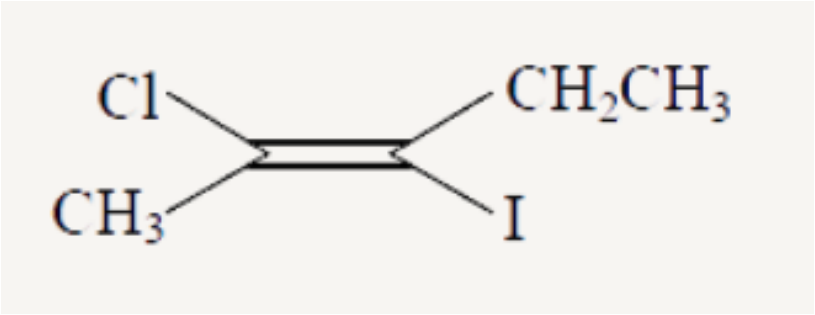
409. The IUPAC name of the following compound



is -

A. cis-2-chloro-3-iodo-2-pentene

B. trans-2-chloro-3-iodo-2-pentene

C. cis-3-iodo-4-chloro-3-pentene

D. trans-3-iodo-4-chloro-3-pentene

Answer: B

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410. An orgainc compound A upon reacting with NH_3 gives B On heating B give C. C in presence KOH reacts with Br_2 to yield $CH_3CH_2NH_2A$ is .

A. CH_3CH_2COOH

B. CH_3COOH

C. $CH_3CH_2CH_2COOH$

D. CH_3 - C | CH_3HCOOH

Answer: A

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411. Match the compounds given in List-I with List-II and select the suitable option using the code given below :

List-I		List-II	
(a)	*Benzaldehyde*	(i)	Phenolphthalein
(b)	*Phthalic anhydride*	(ii)	Benzoin condensation
(c)	*Phenyl benzoate*	(iii)	Oil of wintergreen
(d)	Methyl salicylate	(iv)	Fries rearrangement

A. $\begin{matrix} A & B & C & D \\ ii & i & iv & iii \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ iv & i & iii & ii \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ iv & ii & iii & i \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ ii & iii & iv & i \end{matrix}$

Answer: A

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412. Which of the statements about "Denaturation" given below are correct ?

(1) Denaturation of proteins causes loss of secondary and tertiary structures of the protein.

(2) Denaturation leads to the conversion of double strand of DNA into

single strand.

(3) Denaturation affects primary structure which gets distorted.

A. (a), (b) and (c)

B. (b) and (c)

C. (a) and (c)

D. (a) and (b)

Answer: D

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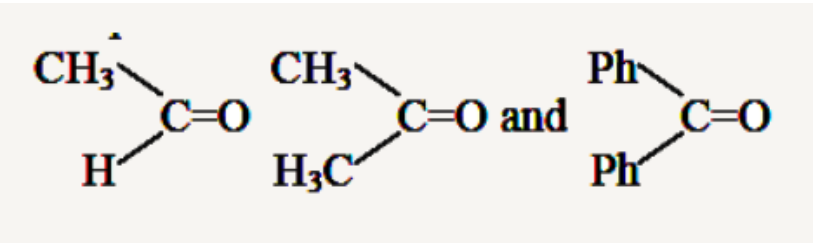
413. The order of reactivity of phenyl magnesium bromide (PhMgBr) with the following compounds :



A. $I > II > III$

B. $III > II > I$

C. $II > I > II$

D. $I > III > II$

Answer: A

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414. Consider the reactions:

$$(i)\left(CH_3\right)_2CH - CH_2Br \xrightarrow{C_2H_5OH} \left(CH_3\right)_2CH - CH_2OC_2H_5 + HBr$$

$$(ii)\left(CH_3\right)_2CH - CH_2Br \xrightarrow{C_2H_5O^-} \left(CH_3\right)_2CH - CH_2OC_2H_5 + Br^-$$

The mechanisms of reactions (i) and (ii) are respectively :

A. S_{N^2} and S_{N^1}

B. S_{N^1} and S_{N^2}

C. S_{N^1} and S_{N^1}

D. S_{N^2} and S_{N^2}

Answer: D

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415. 2, 3 - Dimethyl-2 - butene can be prepared by heating which of the following compounds with a strong acid ?

A. $\left(CH_3\right)_2C = CH - CH_2 - CH_2$

B. $\left(CH_3\right)_2CH - CH_2 - CH = CH_2$

C. $\left(CH_3\right)_2CH - C \mid CH_3H - CH = CH_2$

D. $\left(CH_3\right)_2C - CH = CH_2$

Answer: D

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416. Gadolinium belongsd to 4f series. It's atomic number is 64. which of the following is the correct electronic configuration of gadolinium ?

A. $[Xe]4f^{2}5d^{1}6s^{2}$

B. $[Xe]4f^{6}5d^{2}6s^{2}$

C. $[Xe]4f^{8}6d^{2}$

D. $[Xe]4f^{9}5s^{1}$

Answer: A

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417. The formation of oxide ion $O^{2-}(g)$ from oxygen atom requires first an exothermic and then an endothermic step as shown below

$O(g) + e^{-} \rightarrow O^{-}(g), \Delta H^{-} = -141 kjmol^{-1}$

$O^{-}(g) + e^{-} \rightarrow O^{2-}(g), \Delta H^{-} = +780 kjmol^{-1}$

Thus, process of formation of O^{2-} in gas phase is unfavourable even through O^{2-} is isoelectronic with neon. It is due to the fact that A) oxygen is more electronegative B) addition of electron in oxygen results in larget size of the ion C) electron repulsion outweights the stability

gained by achieving noble gas configuration D) O^- ion has comparatively smaller size than oxygen atom

A. Oxygen is more electronegative

B. addition of electron in oxygen results in larger size of the ion

C. electron repulsion outweighs the stability gained by achieving noble gas configuration

D. O^- ion has comparatively smaller size than oxygen atom

Answer: C

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418. The number of structure isomers possible from the molecular formula C_3H_9N is:

A. 2

B. 3

C. 4

D. 5

Answer: C

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419. In the equilibrium constant for $N_2(g) + O_2(g) \Leftrightarrow 2NO(g)$ is K, the equilibrium constant for $\frac{1}{2}N_2(g) + \frac{1}{2}O_2(g) \Leftrightarrow NO(g)$ will be:

A. K

B. K^2

C. $K^{1/2}$

D. $\frac{1}{2}K$

Answer: C

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420. Which one of the following pairs of solution is not an acidic buffer?

A. H_2CO_3 and Na_2CO_3

B. H_3PO_4 and Na_3PO_4

C. $HClO_4$ and $NaClO_4$

D. CH_3COOH and CH_3COONa

Answer: C

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421. Aqueous solution of which of the following compounds is the best conductor of electric current?

A. Ammonia, NH_3

B. Fructose, $C_6H_{12}O_6$

C. Acetic acid, $C_2H_4O_2$

D. Hydrochloric acid HCl

Answer: D

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422. Caprolactam, is used for the manufacture of

A. Terylene

B. Nylon-6,6

C. Nylon-6

D. Teflon

Answer: C

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423. On heating which of the following release CO_2 most easily ?

A. $MgCO_3$

B. $CaCO_3$

C. K_2CO_3

D. Na_2CO_3

Answer: A

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424. Strong reducing behaviour of H_3PO_2 is due to

A. High oxidation state of phosphorus

B. Presence of two -OH groups and one P-H bond

C. Presence of one -OH group and two P-H bonds

D. High electron gain enthalpy of phosphorus.

Answer: C

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425. Decreasing order of stability of O_2, O_2^-, O_2^+ and O_2^{2-} is

A. $O_2 > O_2^+ > O_2^{2-} > O_2^-$

B. $O_2^- > O_2^{2-} > O_2^+ > O_2$

C. $O_2^+ > O_2 > O_2^- > O_2^{2-}$

D. $O_2^{2-} > O_2^{2-} > O_2 > O_2^+$

Answer: C

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426. The number of water molecules is maximum in

A. 18 gram of water

B. 18 moles of water

C. 18 moles of water

D. 1.8 gram of water

Answer: B

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427. In which of the following pairs, both the species are not isostructural?

A. NH_3, PH_3

B. XeF_4, XeO_4

C. $SiCl_4, PCl_4^+$

D. Diamond, silicon carbide

Answer: B

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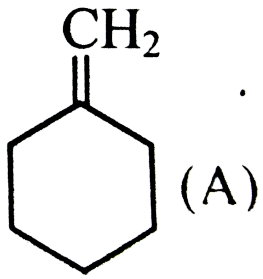
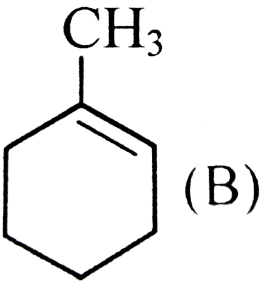
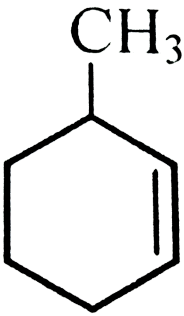
428. In the reaction with HCl, an alkene reacts in accordance with the Markovnikov's rule. The possible alkene is

A. 

B. 

C. A and B

D. 

Answer: C

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429. Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified $KMnO_4$ for complete oxidation ?

A. FeC_2O_4

B. $Fe\left(NO_2\right)_2$

C. $FeSO_4$

D. $FeSO_3$

Answer: C

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430. Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group ?

A. $-CHCl_2$

B. $-CHO$

C. $-CH_2Cl$

D. $-COOH$

Answer: B

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431. The vacant space in bcc lattice unit cell is :

A. 0.23

B. 0.32

C. 0.26

D. 0.48

Answer: B

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432. Which of the following statement given below is incorrect?

A. ONF is isoelectronic with O_2N^-

B. OF_2 is an oxide of fluorine

C. Cl_2O_7 is an anhydride of perchloric acid

D. O_3 molecule is bent

Answer: B

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433. The name of complex ion, $\left[Fe\left(CN_6\right)\right]^{3-}$ is

A. Tricyanoferrate (III) ion

B. hexacyanidoferrate (III) ion

C. Hexacyanoiron (III) ion

D. Hexacyanitoferrate (III) ion

Answer: B

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434. If Avogadro number N_A is changed from $6.022 \times 10^{23} mol^{-1}$ to 6 $.022 \times 10^{23} mol^{-1}$, this would change:

A. the ratio of chemical species to each other in a balanced equation

B. the ratio of elements to each other in a compound

C. the definition of mass in units of grams

D. the mass of one mole of carbon

Answer: C

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435. Which of the following statement is not correct for a nucleophile ?

A. Nucleophiles attack low e^- density sites

B. Nucleophiles are not electron seeking

C. Nucleophile is a lewis acid

D. Ammonia is a nucleophile

Answer: C

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436. A gas such as carbon monoxide would be most likely to obey the ideal gas law at

A. high temperature and high pressure

B. low temperatures and low pressures

C. high temperature and low pressures

D. low temperatures and high pressures

Answer: C

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437. The hybridization involved in complex $\left[Ni(CN)_4\right]^{2-}$ is $(At.\ No.\ Ni = 28)$

A. d^2sp^2

B. d^2sp^3

C. dsp^2

D. sp^3

Answer: C

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438. Enthalpy of combustion of carbon to CO_2 is $-393.5kJmol^{-1}$. Calculate the heat released upon formation of $35.2g$ of CO_2 from carbon and dioxygen gas.

A. $-630kJ$

B. $-3.15kJ$

C. $-315kJ$

D. $+315kJ$

Answer: C

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439. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What be the percentage purity of magnsesium carbonate in the sample?

A. 60

B. 84

C. 75

D. 96

Answer: B

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440. What is the fraction of the solute in a 1.00 m aqueous solution ?

A. 0.0354

B. 0.0177

C. 0.177

D. 1.77

Answer: B

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441. The correct statement regarding defects in crystalling solids.

A. Frenkel defect is a dislocation defect

B. frenkel defect is found in the halides of alkaline metals schottky defect have no effect on the density of crystalline solids

C. Schottky defect have no effect on the density of crystalline solids

D. Frenkel defects decrease the density of crystalline solids

Answer: A

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442. Stability of monovalent and trivalent cations of Ga, In, Tl lie in following sequence :

A. TlltInltGaltAl

B. InltTlltGaltAl

C. GaltInltAlltTl

D. AlltGaltInltTl

Answer: C

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443. Two possible stereostructures of $CH_3CHOH.COOH$, which are optically active, are called:

A. Enantiomers

B. Mesomers

C. Diastereomers

D. Atropisomers

Answer: A

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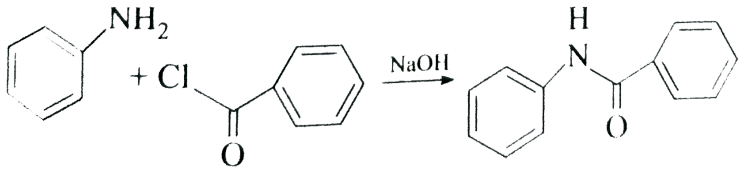
444.



The following reaction is known by the name:

A. Acetylation reaction

B. Schotten-Baumen reaction

C. Friedel-Craft's reaction

D. Perkin's reaction

Answer: B

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445. The sum of coordination number and oxidation number of the metal M in the complex $\left[M(en)_2\left(C_2O_4\right)\right]CI$ (where en is ethylenediamine) is:

A. 7

B. 8

C. 9

D. 6

Answer: C

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446. Reaction of carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is:

A. hydrocyanic acid

B. sodium hydrogen sulphite

C. a grignard reagent

D. hydrazine in presence of feebly acidic solution

Answer: D

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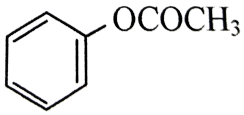
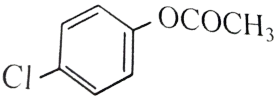
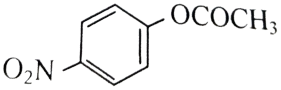
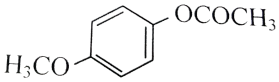
447. Which of the the following esters gets hydrolysed most easily under alkaline conditions?

A. 

B. 

C. 

D. 

Answer: C

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448. In an $S_N1$reaction on chiral centres, there is

A. 100% retention

B. 100% inversion

C. 100% racemization

D. inversion more than retention leading to partial racemization

Answer: D

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449. The rate constant of the reaction $A \rightarrow B$ is 0.6×10^{-3} mole per second. If the concentration of A is $5M$, then concentration of B after 20 minutes is:

A. 0.36 M

B. 0.72 M

C. 1.08 M

D. 3.60 M

Answer: B

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450. What is the pH of the resulting solution when equal volumes of $0.1MNaOH$ and $0.01MHCl$ are mixed?

A. 7

B. 1.04

C. 12.65

D. 2

Answer: C

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451. Number of possible isomer for the complex $\left[Co(en)_2CI_2\right]CI$ will be: (em = ethylenediamine)

A. 3

B. 4

C. 2

D. 1

Answer: A

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452. The variation of the boiling points of the hydrogen halides is in the order $HF > HI > HBr > HCl$.

What explains the higher boiling point of hydrogen fluoride?

A. The bond energy of HF molecules is greater than in other hydrogen halides

B. the effect of nuclear shielding is much reduced in fluorine which polarizes the HF molecule

C. The electro negativity of fluorine is much higher than for other elements in the group

D. there is strong hydrogen bonding between HF molecules

Answer: D

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453. What is the mass of the precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% NaCl solution?

A. 7g

B. 14g

C. 28g

D. 3.5g

Answer: A

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454. The oxidation of benzene by V_2O_5 in the presence of aire produces

A. benzoic acid

B. benzaldehyde

C. benzoic anhydride

D. maleic anhydride

Answer: D

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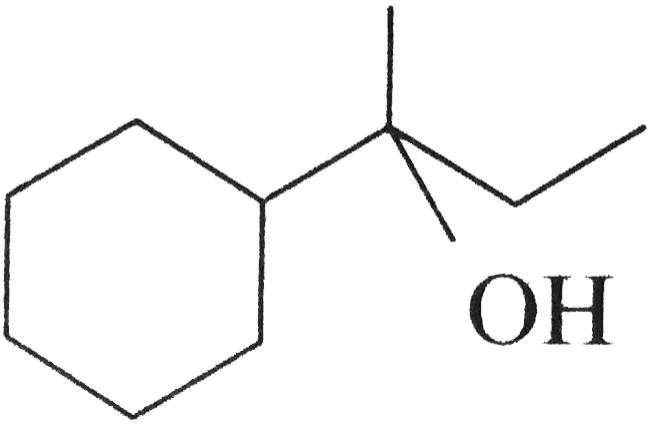
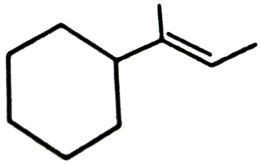
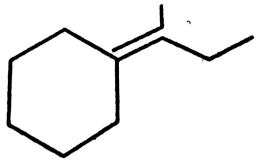
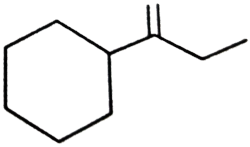
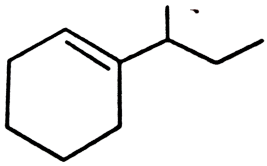
455. Which of the following is not the product of dehydration of



A. 

B. 

C. 

D. 

Answer: D

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456. Method by which aniline cannot be prepared is:

A. reduction of nitrobenzene with H_2/Pd in ethanol

B. potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution

C. hydrolysis of phenyisocyanide with acidic solution

D. degradation of benzamide with bromine in alkaline solution

Answer: B

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457. Which of the following reaction(s) can be used for the preparation of alkyl halides ?

$(i) CH_3CH_2OH + HCl \xrightarrow{\text{anhyd.}ZnCl_2}$

(ii) $CH_3CH_2OH + HCl \rightarrow$

$(iii) \left(CH_3\right)_3C\text{ - }OH + HCl \rightarrow$

$(iv) \left(CH_3\right)_2CHOH + HCl \xrightarrow{\text{anhyd}ZnCl_2}$

A. (IV) only

B. (III) and (IV) only

C. (I), (III) and (IV) only

D. (I) and (II) only

Answer: C

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458. Which is the correct order of increasing energy of the listed orbitals in the atom of titanium ? (At. No. Z = 22)

A. 3s 3p 3d 4s

B. 3s 3p 4s 3d

C. 3s 4s 3p 3d

D. 4s 3s 3p 3d

Answer: A

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459. In the exteraction of copper from its sulphide ore, the metal is fanally obtained by the reduction of caprous oxide with

A. copper (I) sulphide

B. sulphur dioxide

C. iron(II) sulphide

D. carbon monoxide

Answer: A

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460. Which one of the following compounds shows the presence of intramolecular hydrogen bond?

A. H_2O_2

B. HCN

C. Cellulose

D. Concentrated acetic acid

Answer: C

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461. The molar conductivity of a $0.5 mol/dm^3$ solution of $AgNO_3$ with electrolytic conductivity of $5.76 \times 10^{-3} Scm^{-1}$ at $298K$ is

A. 2.88 S cm^2/mol

B. $11.52S \quad cm^{-2}/mol$

C. $0.086S \quad cm^2/mol$

D. $28.8S \quad cm^2/mol$

Answer: B

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462. The decomposition of phosphine $\left[PH_3\right]$ on tungsten at low pressure is a first-order reaction. It is because the

A. rate is proportional to the surface coverage

B. rate is inversely proportional to the surface coverage

C. rate is independent of the surface coverage

D. rate of decomposition is very slow

Answer: A

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463. The coagulation value in millimoles per litre of the electrolyes used for the coagulation of As_2S_3 are given below:

I. $(NaCl) = 52$, II. $\left(BaCl_2\right) = 0.69$

III. $\left(MgSO_4\right) = 0.22$

The correct order of their coagulating power is

A. lgtIlgtIII

B. IIgtIgtIII

C. IIIgtIIgtI

D. IIIgtIgtII

Answer: C

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464. During the electrolysis of molten sodium chloride, the time required to produce $0.10mol$ of chlorine gas using a current of 3 amperes is

A. 55 minutes

B. 110 minutes

C. 220 minutes

D. 330 minutes

Answer: B

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465. How many electrons can fit in the orbital for which n = 3 and l = 1 ?

A. 2

B. 6

C. 10

D. 14

Answer: A

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466. For a sample of perfect gas when its pressure is changed isothermally from p_i to p_f, the entropy change is given by

A. $\Delta S = nR\ln\left(\frac{p_f}{p_i}\right)$

B. $\Delta S = nR\ln\left(\frac{p_i}{p_f}\right)$

C. $\Delta S = nRT \ln\left(\frac{p_f}{p_i}\right)$

D. $\Delta S = RT \ln\left(\frac{p_i}{p_f}\right)$

Answer: B

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467. The van't hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is

A. 0

B. 1

C. 2

D. 3

Answer: D

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468. The percentage of pyridine $\left(C_5H_5N\right)$ that forms pyridinium ion $\left(C_5H_5N^+H\right)$ in a 0.10 M aqueous pyridine solution (K_b for $C_5H_5N = 1.7 \times 10^{-9}$) is

A. 6.0E-5

B. 0.00013

C. 0.0077

D. 0.016

Answer: B

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469. In calcium, fluoride having the florite structures. The coordination number for calcium ion $\left(Ca^{2+}\right)$ and fluoride ion $\left(F^-\right)$ are

A. 4 and 2

B. 6 and 6

C. 8 and 4

D. 4 and 8

Answer: C

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470. If $E_{cell}^{\ominus}$ for a given reaction is negative, which gives the correct relationships for the values of $\Delta G^{\ominus}$ and K_{eq}?

A. $\Delta G^{\circ} > 0 : K_{eq} < 1$

B. $\Delta G^{\circ} > 0, K_{eq} > 1$

C. $\Delta G^{\circ} < 0, K_{eq} > 1$

D. $\Delta G^{\circ} < 0, K_{eq} < 1$

Answer: A

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471. Which one of the following is incorrect for ideal solution?

A. $\Delta H_{mix} =$

B. $\Delta U_{mix} = 0$

C. $\Delta P = P_{obs} - P_{\text{calculated by Raoult's law}} = 0$

D. $\Delta G_{mix} = 0$

Answer: D

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472. The pH of a solution of AgCI(s) with solubility product 1.6×10^{-10} in 0.1 M Nacl solution would be :

A. $1.26 \times 10^{-5} M$

B. $1.6 \times 10^{-9} M$

C. $1.6 \times 10^{-11} M$

D. zero

Answer: B

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473. Suppose elements X and Y combine to form two compounds XY_2 and X_3Y_2 when 0.1 mole of former weigh $10g$ while 0.05 mole of the latter weigh $9g$. What are the atomic weights of X and Y.

A. 40, 30

B. 60, 40

C. 20, 30

D. 30, 20

Answer: A

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474. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charger on electron $= 1.60 \times 10^{-19} C$)

A. 6×10^{23}

B. 6×10^{20}

C. 3.75×10^{20}

D. 7.48×10^{23}

Answer: C

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475. Boric acid is an acid because its molecule

A. contains replaceable H^+ ion

B. gives up a proton

C. accepts OH^- from water releasing proton

D. combines with proton from water molecule

Answer: C

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476. AlF_3 is soluble in HF only in presence of KF. It is due to the formation of

A. $K_3[AlF_3H_3]$

B. $K_3[AlF_6]$

C. AlH_3

D. $K[AlF_3H]$

Answer: B

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477. Zine can be coated on iron to produce galvanize3d iron but the reverse is not possible it is because

A. zinc is ligher than iron

B. zinc has lower melting point than iron

C. zinc has lower negative electrode potential than iron

D. zinc has higher negative electrode potential than iron

Answer: D

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478. Suspension of slaked lime in water is known as

A. limewater

B. quicklime

C. milk of lime

D. aqueous solution of slaked lime

Answer: C

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479. The hybridisatipon of atomic orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are

A. sp, sp^3 and sp^2

B. sp^2, sp^3 and sp

C. sp, sp^2 and sp^3

D. sp^2, sp and sp^3

Answer: C

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480. Which of the of the following fluoro -compouds is most likely to beahve as a Lewis base?

A. BF_3

B. PF_3

C. CF_4

D. SiF_4

Answer: B

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481. Which of the following pairs of ions are isoelectronic and isostructural?

A. CO_3^{2-}, NO_3^-

B. ClO_3^-, CO_3^{2-}

C. SO_3^{2-}, NO_3^-

D. ClO_3^-, SO_3^{2-}

Answer: A::D

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482. In context with beryllium, which one of the following statements is incorrect ?

A. It is rendered passive by nitric acid

B. It forms Be_2C

C. Its salts rarely hydrolyze

D. Its hydride is electron-deficient and polymeric

Answer: C

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483. Hot concentrated sulpuric acis is a moderatly strong oxidizing agent. Which of the following reaction does not shwo oxidizing behaviour?

A. $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$

B. $3S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

C. $C + 2H_2SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$

D. $CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$

Answer: D

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484. Which of the following pairs of d-orbitals will hare electron density along the axes ?

A. d_{z^2}, d_{xz}

B. d_{xz}, d_{yz}

C. $d_{z^2}, d_{x^2-y^2}$

D. $d_{xy}, d_{x^2-y^2}$

Answer: C

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485. The correct geometery and hybridizationn for XeF_4 are

A. octahedral, sp^3d^2

B. trigonal bipyramidal, sp^3d

C. planar triangle, sp^3d^3

D. square planar, sp^3d^2

Answer: D

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486. Among the following ,which one is the wrong statement

A. PH_5 and $BiCl_5$do not exist

B. $p\pi$ - $d\pi$ bonds are present in SO_2

C. SeF_4 and CH_4 have same shape

D. I_3^+ has bent geometry

Answer: C

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487. The correct increasing order of trans-effect of the following species is

A. $NH_3 > CN^- > Br^- > C_6H_5^-$

B. $CN^- > C_6H_5^- > Br^- > NH_3$

C. $Br^- > CN^- > NH_3 > C_6H_5^-$

D. $CN^- > Br^- > C_6H_5^- > NH_3$

Answer: B

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488. Which one of the following statements related to lanthanons is incorrect ?

A. Europium shows +2 oxidation state

B. The basicity decreases as the ionic radius decreases from Pr to Lu

C. All the lanthanons are much more reactive than aluminium

D. Ce (+4) solutions are widely used as oxidizing agent in volumetric analysis

Answer: C

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489. Jahn - Teller effect is not observed in high spin complexes of

A. d^7

B. d^8

C. d^4

D. d^9

Answer: B

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490. Which of the following can beused as the halide component for friedel-crafts reaction?

A. Chlorobenzene

B. Bromobenzene

C. Chloroethene

D. Isopropyl chloride

Answer: D

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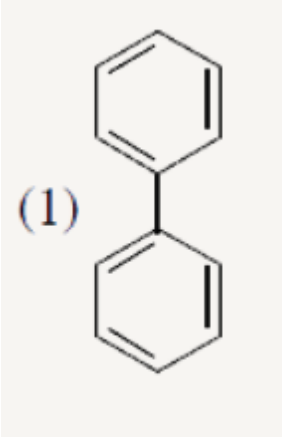
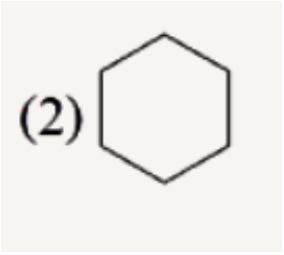
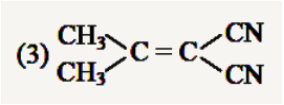
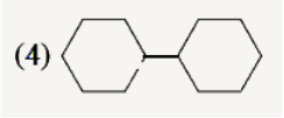
491. In which of the following moleucles, all atoms are coplanar?

A. 

B. 

C. 

D. 

Answer: A

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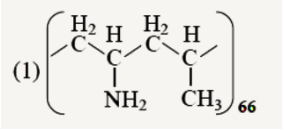
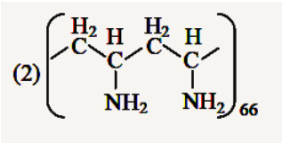
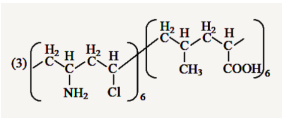
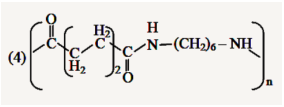
492. Which one of the following structures represents nylon-6,6 polymer?

A. 

B. 

C. 

D. 

Answer: D

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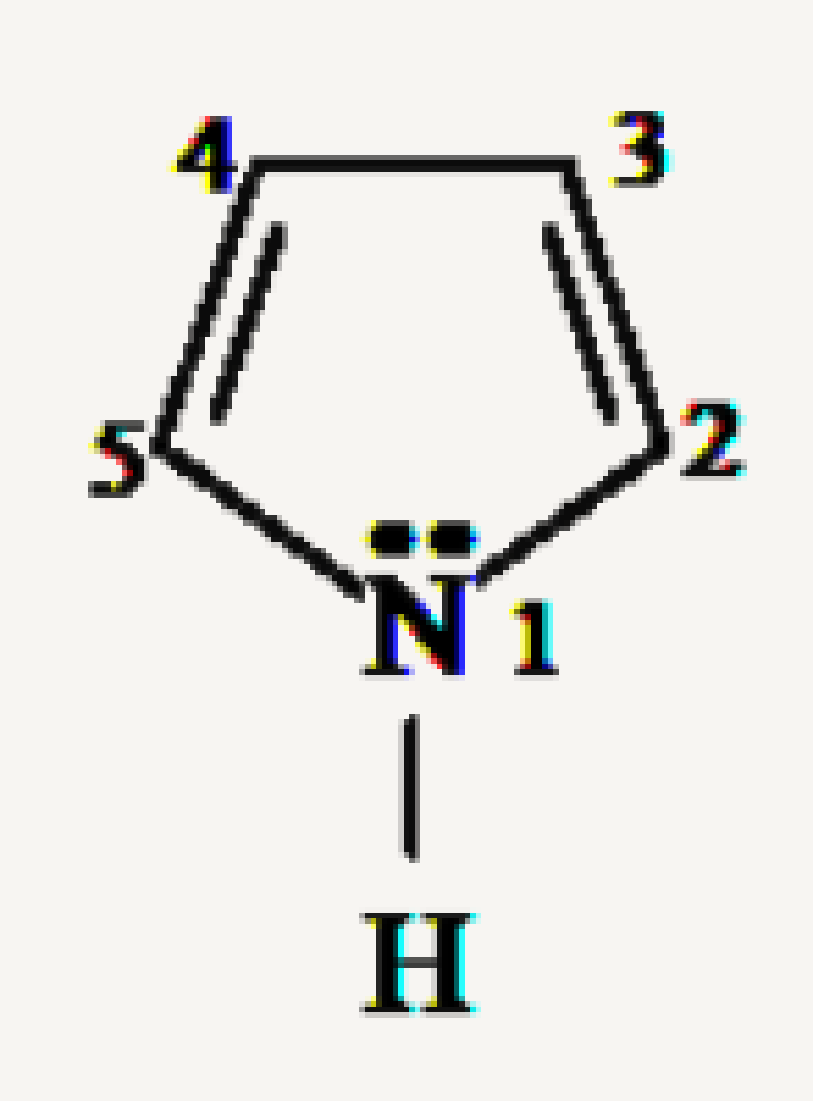
493. In pyrrole



the electron density is maximum on

A. 2 and 3

B. 3 and 4

C. 2 and 4

D. 2 and 5

Answer: D

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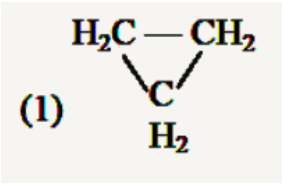
494. Which of the following compounds shall not produce propene by reaction with HBr followed by elimination or direct only elimination reaction?

A. 

B. $H_3 - \overset{H_2}{C} - CH_2OH$

C. $H_2C = O$

D. $H_3C - \overset{H_2}{C} - CH_2Br$

Answer: C

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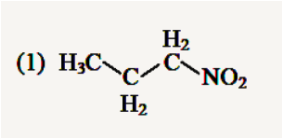
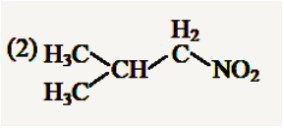
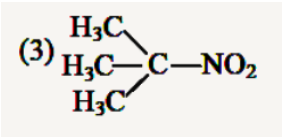
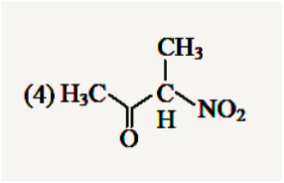
495. Which one of the following -compounds does not react with nitrous acid ? .

A. 

B. 

C. 

D. 

Answer: C

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496. The central dogma of molecular genetics states that the genetic information flows from

A. Amino acids $\rightarrow$ proteins $\rightarrow$ DNA

B. $DNA \rightarrow$ carbohydrates $\rightarrow$ proteins

C. $DNA \rightarrow RNA \rightarrow$ protiens

D. $DNA \rightarrow RNA \rightarrow$ carbohydrates

Answer: C

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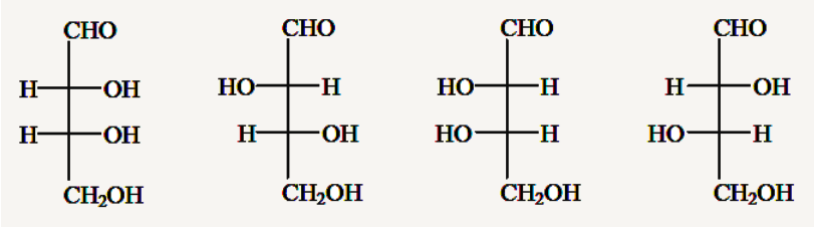
497. The correct corresponding order of names of four aldoses with configuration given below:



respectively is

A. L-erythrose, L-threose, L-erythrose, D-threose

B. D-threose, D-erythrose, L-threose, L-erythrose

C. L-erythrose, L-threose, L-erythrose, D-threose

D. D-erythrose, D-threose, Lerythrose, L-threose

Answer: D

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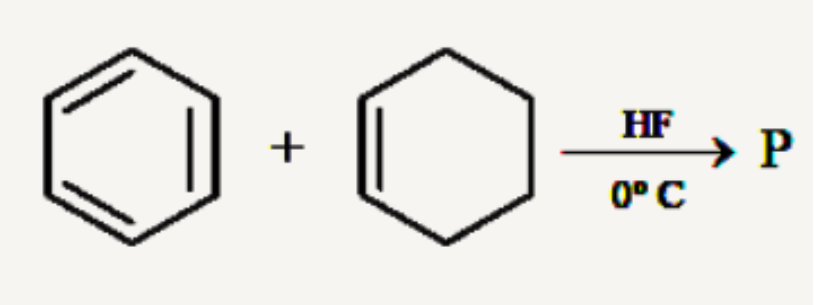
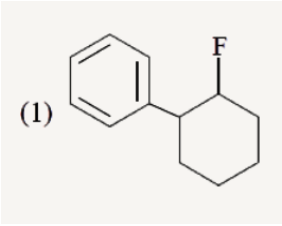
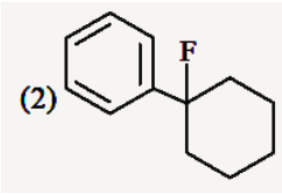
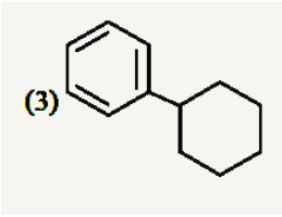
498. In the given reaction

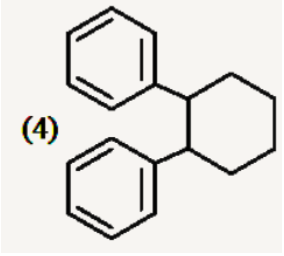


the product P is

A. 

B. 

C. 

D. 

Answer: C

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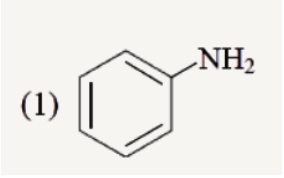
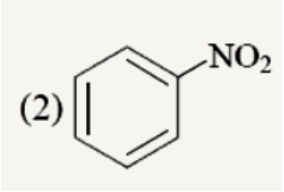
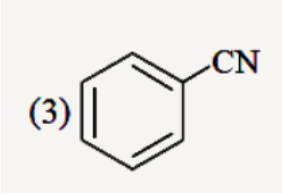
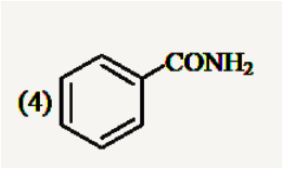
499. A given nitrogen-containing compound A reacts with Sn/HCI followed by HNO_2 to give an unstable compund $B.B$ on treatment with pheno1 forms a beautiful coloured compound C with the molecular formula $C_{12}H_{10}N_2O$ The structure of compound A is .

A. 

B. 

C. 

D. 

Answer: B

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500. Consider the reaction :

$CH_3CH_2CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$

This reaction will be the fastest in :

A. ethanol

B. methanol

C. N, N' -dimethylformamide (DMF)

D. water

Answer: C

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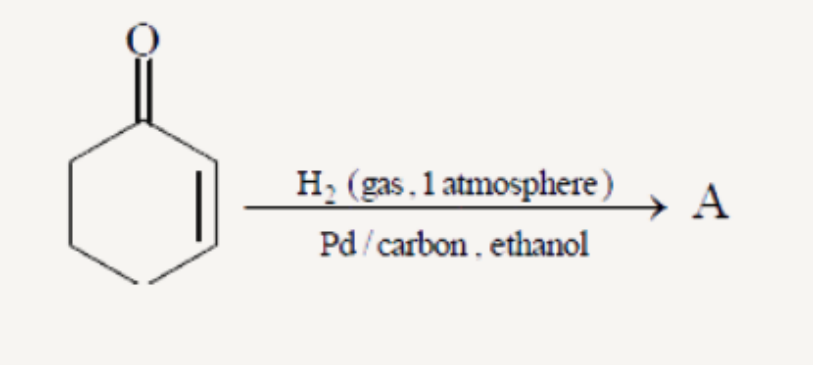
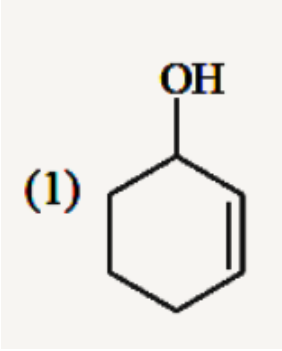
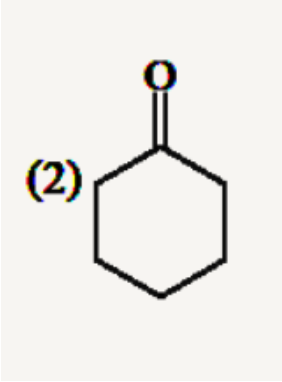
501. The correct structure of the product A formed in the reaction

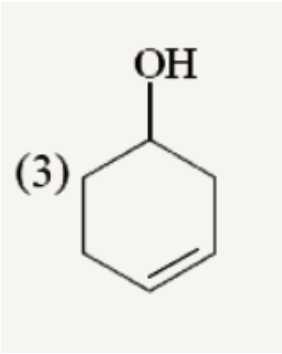


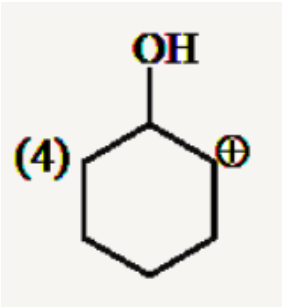
is

A.



B. 

C. 

D. 

Answer: B

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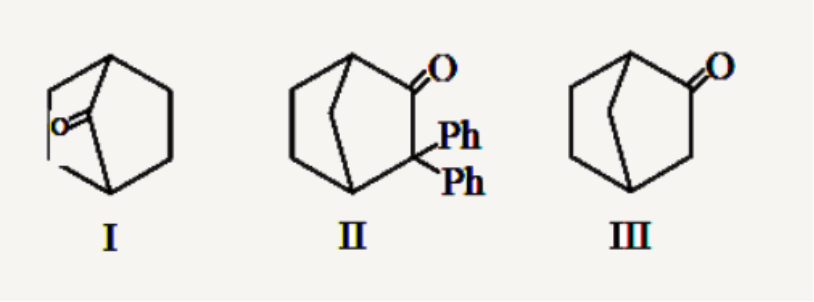
502. Which among the given molecules can exhibit tautomerism?



A. III only

B. Both I and III

C. Both I and II

D. Both II and III

Answer: A

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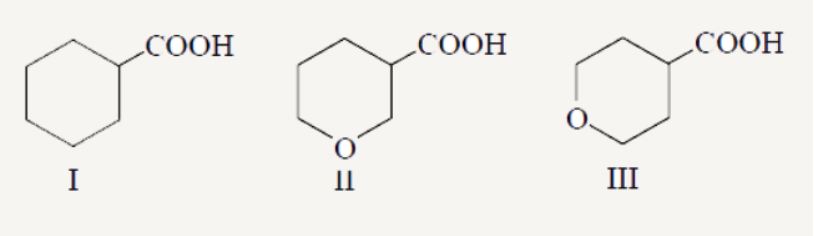
503. The correct order of strengths of the carboxylic acids



is

A. $I > II > III$

B. $II > III > I$

C. $III > II > I$

D. $II > I > III$

Answer: B

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504. The compound that will react most readily with gaseous bromine has the formula

A. C_3H_6

B. C_2H_2

C. C_4H_{10}

D. C_2H_4

Answer: A

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505. With respect to the conformers of ethane, which of the following statements is true ?

A. Bond angle remains same but bond length changes

B. Bond angle changes but bond length remains same

C. Both bond angle and bond length change

D. Both bond angles and bond length remains same

Answer: D

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506. Which of the following pairs of compounds is isoelectronic and isostructural?

A. $BeCl_2, XeF_2$

B. TeI_2, XeF_2

C. IBr_2^-, XeF_2

D. IF_3, XeF_2

Answer: C

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507. $HgCl_2$ and I_2 both when dissolved in water containing I^- ions the pair of species formed is:

A. HgI_2, I_3^-

B. HgI_2, I^-

C. HgI_2^{2-}, I_3^-

D. Hg_2I_2, I^-

Answer: C

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508. Mixture of chloroxylenol and terpineol acts as :

A. Analgesic

B. Antiseptic

C. Antipyretic

D. Antibiotic

Answer: B

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509. Which is the incorrect statement?

A. $FeO_{0.98}$ has non stoichiometric metal deficiency defect

B. Density decreases in case of crystals with Schottky's defect

C. NaCl(s) is insulator, silicon is semiconductor, silver is conductor, quartz is piezo electric crystal

D. Frenkel defect is favoured in those ionic compounds in which sizes of cation and anions are almost equal

Answer: A::D

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510. Concentration of the Ag^+ ions in a saturated solution of $Ag_2CO_2O_4$ is $2.2 \times 10^{-4} molL^{-1}$ Solubility product of $Ag_2C_2O_4$ is:

A. 2.42×10^{-8}

B. 2.66×10^{-12}

C. 4.5×10^{-11}

D. 5.3×10^{-12}

Answer: D

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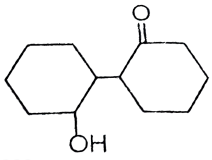
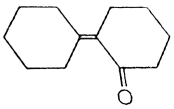
511. Of the following which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?

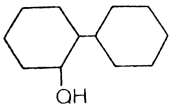
A. (1)



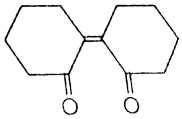
B. (2)



C. (3)



D. (4)



Answer: B

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512. The species, having bonds angle of 120° is

A. PH_3

B. ClF_3

C. NCl_3

D. BCl_3

Answer: D

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513. If molarity of the dilute solutions is doubled ,the value of molal depression constant $\left(K_f\right)$ will be:

A. Doubled

B. Halved

C. Tripled

D. Unchanged

Answer: D

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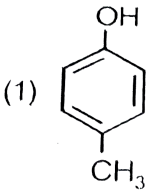
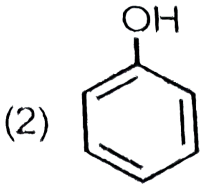
514. Which one is the most acidic compound?

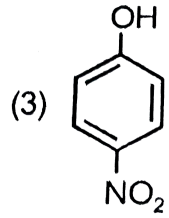
A.



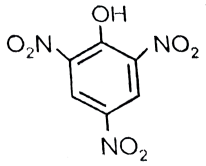
B.



C. (3)



D. (4)



Answer: D

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515. It is because of inability of ns^2 electrons of the valence shell to participate in bonding that:

A. Sn^{2+} is reducing while Pb^{4+} is oxidising

B. Sn^{2+} is oxidising while Pb^{4+} is reducing

C. Sn^{2+} and Pb^{2+} are both oxidising and reducing

D. Sn^{4+} is reducing while Pb^{4+} is oxidising

Answer: A

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516. Predict the correct intermediate and product in the following reaction:

$$H_3C\text{-}C \equiv CH \xrightarrow[HgSO_4]{H_2O, H_2SO_4} \text{Intermediate} \rightarrow \text{Product}$$

A. $A: H_3\text{-}\_SO(4)C| = CH_2 \quad B: H_3C\text{-}C| |O\text{-}CH_3$

B. $A: H_3C\text{-}C|OH\text{-}CH_2 \quad B: H_3C\text{-}C|SO_4 = CH_2$

C. $A: H_3C\text{-}C| |O\text{-}CH_3 \quad B: H_3C\text{-}C \equiv CH$

D. $A: H_3C\text{-}C|OH = CH_2 \quad B: H_3C\text{-}C| |O\text{-}CH_3$

Answer: D

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517. Which one of the following statements is not correct?

A. Catalyst does not initiate any reaction

B. The value of equilibrium constant is changed in the presence of a catalyst in the reaction at equilibrium

C. Enzymes catalyse mainly bio-chemical reactions

D. Coenzymes increase the catalytic activity of enzyme

Answer: B

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518. Which one is the wrong statement ?

A. de-Broglie's wavelength is given by $\lambda = \frac{h}{mv}$ where m = mass of the particle, v=group velocity of the particle

B. The uncertainty principle is $\Delta E \times \Delta t \geq \frac{h}{4\pi}$

C. Half-filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced

arrangement

D. The energy of 2s orbital is less than the energy of 2p orbital in case of Hydrogen like atoms

Answer: D

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519. A gas is allowed to expand in a well insulated container against a constant external pressure of $2.5atm$ from an initial volume of $2.50L$ to a final volume of $4.50L$. The change in internal energy ΔU of the gas in joules will be:

A. 1136.23 J

B. $-500J$

C. $-505J$

D. $+505J$

Answer: C

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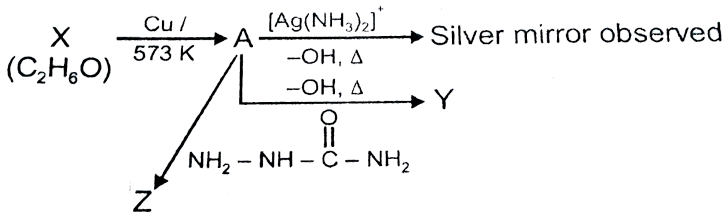
520. Consider the reactions :



Identify A, X, Y and Z

Identify A,X,Y and Z

A. A-Methoxymethane, X-Ethanoic acid, Y-Acetate ion, Z-hydrazine

B. A-Methoxymethane, X-Ethanol, Y-Ethanoic acid, Z-Semicarbazide

C. A-Ethanal, X-Ethanol, Y-But-2-enal, Z-Semicarbazone

D. A-Ethanol, X-Acetaldehyde, Y-Butanone, Z-Hydrazone

Answer: C

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521. Which one is the correct order of acidity ?

A. $CH_2 = CH_2 > CH_3 - CH = CH_2 > CH_3 - C \equiv CH > CH \equiv CH$

B. $CH \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2 > CH_3 - CH_3$

C. $CH \equiv CH > CH_2 = CH_2 > CH_3 - C \equiv CH > CH_3 - CH_3$

D. $CH_3 - CH_3 > CH_2 = CH_2 > CH_3 - C \equiv CH > CH \equiv CH$

Answer: B

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522. The emf of a Daniell cell at $298K$ is E_1

$Zn \left| ZnSO_4(0.01M) \right| \left| CuSO_4(1.0M) \right| Cu$

When the concentration of $ZNSO_4$ is $1.0M$ and that of $CuSO_4$ is $0.01M$, the *emf* changed to E_2. What is the relationship between E_1 and $E(2)$?

A. $E_1 = E_2$

B. $E_1 < E_2$

C. $E_1 > E_2$

D. $E_2 = 0 \neq E_1$

Answer: C

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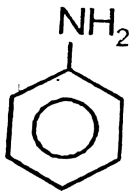
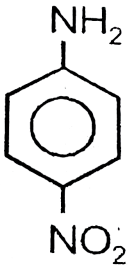
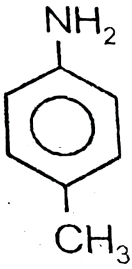
523. The correct increasing order of basic strength for the following compounds is



(I)



(II)



(III)

A. $II < III < I$

B. $III < I < III$

C. $III < II < I$

D. $II < I < III$

Answer: D

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524. In which pair of ions both the species contains S - S bond?

A. $S_2O_7^{2-}, S_2O_3^{2-}$

B. $S_4O_6^{2-}, S_2O_3^{2-}$

C. $S_2O_7^{2-}, S_2O_8^{2-}$

D. $S_4O_6^{2-}, S_2O_7^{2-}$

Answer: B

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525. The correct order of the stoichiometries of $AgCl$ formed when $AgNO_3$ in excess is treated with the complexes: $CoCl_3.6NH_3$, $CoCl_3.5NH_3$, $CoCl_3.4NH_3$ respectively is:

A. 1 AgCl, 3AgCl, 2AgCl

B. 3AgCl, 1 AgCl, 2AgCl

C. 3AgCl, 2AgCl , 1AgCl

D. 2AgCl , 3AgCl, 1 AgCl

Answer: C

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526. Match the interhalogen compounds of column I with the geometry in column II and assign the correct code

Column I	Column II
(a) XX'	(i) T-shape
(b) XX_2'	(ii) Pentagonal bipyramidal
(c) XX_5'	(iii) Linear
(d) XX_7'	(iv) Square-pyramidal
	(v) Tetrahedral

A. (a),(b),(c),(d)
(iii),(iv),(i),(ii)

B. (a),(b),(c),(d)
(iii),(i),(iv),(ii)

C. (a),(b),(c),(d)
(v),(iv),(iii),(ii)

D. (a),(b),(c),(d)
(iv),(iii),(ii),(i)

Answer: B

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527. The reason for the greater range of oxidation states of actinoids is attributed to

A. The radioactive nature of actinoids

B. Actinoid contraction

C. 5f, 6d and 7s levels having comparable energies

D. 4f and 5d levels being close in energies

Answer: C

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528. A 20 litre container at $400K$ contains $CO_2(g)$ at pressure $0.4atm$ and an excess of SrO (neglect the volume of solid SrO). The volume of the container, when pressure of CO_2 attains its maximum value, will be:

(Given that: $SrCO_3(s) \Leftrightarrow SrO(s) + CO_2(g) K_p = 1.6atm$)

A. 5 litre

B. 10 litre

C. 4 litre

D. 2 litre

Answer: A

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529. The correct statement regarding electrophile is:

A. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile

B. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile

C. Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile

D. Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile

Answer: D

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530. Which of the following is a sink for CO?

A. Haemoglobin

B. Micro-organisms present in the soil

C. Oceans

D. Plants

Answer: B

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531. The element $Z = 114$ has been discovered recently. It will belong to which of the family/group and electronic configuration?

A. Halogen family, $[Rn]5f^{14}6d^{10}7s^27p^5$

B. Carbon family , $[Rn]5f^{14}6d^{10}7s^27p^2$

C. Oxygen family , $[Rn]5f^{14}6d^{10}7s^27p^4$

D. Nitrogen family , $[Rn]5f^{14}6d^{10}7s^{2}7p^{6}$

Answer: B

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532. Correct increasing order for the wavelengths of absorption in the visible region by the complexes of Co^{3+} is:

A. $\left[Co(en)_3\right]^{3+}, \left[Co\left(NH_3\right)_6\right]^{3+}, \left[Co\left(H_2O\right)_6\right]^{3+}$

B. $\left[Co\left(H_2O\right)_6\right]^{3+}, \left[Co(en)_3\right]^{3+}, \left[Co\left(NH_3\right)_6\right]^{3+}$

C. $\left[Co\left(H_2O\right)_6\right]^{3+}, \left[Co\left(NH_3\right)_6\right]^{3+}, \left[Co(en)_3\right]^{3+}$

D. $\left[Co\left(NH_3\right)_6\right]^{3+}, \left[Co(en)_3\right]^{3+}, \left[co\left(H_2O\right)_6\right]^{3+}$

Answer: A

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533. Which of the following statements is not correct?

A. Insulin maintains sugar level in the blood of a human body

B. Ovalbumin is a simple food reserve in egg-white

C. Blood proteins thrombin and fibrinogen are involved in blood clotting

D. Denaturation makes the proteins more active

Answer: D

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534. An example of a sigma bonded organometallic compound is:

A. Ruthenocene

B. Grignard's reagent

C. Ferrocene

D. Cobaltocene

Answer: B

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535. Which of the following is dependent on temperature?

A. Molality

B. Molarity

C. Mole fraction

D. Weight percentage

Answer: B

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536. For a given reaction, $\Delta H = 35.5 KJ mol^{-1}$ and $\Delta S = 83.6 JK^{-1} mol^{-1}$. The reaction is spontaneous at: (Assume that ΔH and δS so not vary with temperature)

A. $T < 425K$

B. $T > 425K$

C. All temperatures

D. $T > 298K$

Answer: B

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537. The most suitable method of separation of a mixture of ortho and para nitrophenol in the ratio $1:1$ is :

A. Sublimation

B. Chromatography

C. Crystallisation

D. Steam distillation

Answer: D

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538. Which of the following pairs of species have the same bond order ?

A. CO, NO

B. O_2, NO^+

C. CN^-, CO

D. N_2, O_2^-

Answer: C

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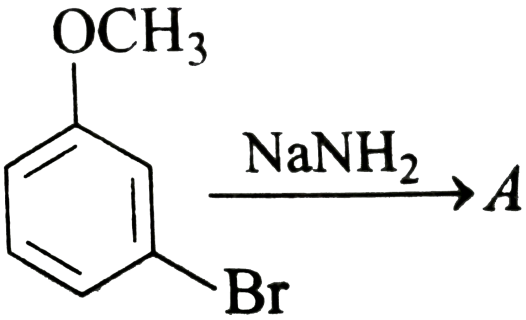
539. Identify A and predict the type of reaction



A. (1)  and substitution reaction

B. (2)  and elimination addition reaction

C. (3)  and cine substitution reaction

D. (4)  and cine substitution reaction

Answer: A

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540. A first order reaction has specific rate of $10^{-2}s^{-1}$. How much time will it take for 20 g of the reactant to reduce to 5 g?

A. 238.6 second

B. 138.6 second

C. 346.5 second

D. 693.0 second

Answer: B

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541. Name the gas that can readily decolourise acidified $KMnO_4$ solution:

A. CO_2

B. SO_2

C. NO_2

D. P_2O_5

Answer: B

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542. The heating of phenyl-methyl ethers with HI produces

A. Ethyl chlorides

B. Iodobenzene

C. Phenol

D. Benzene

Answer: C

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543. Pick out the correct statement with respect to $\left[Mn(CN)_6\right]^{3-}$:

A. It is sp^3d^2 hybridised and octahedral

B. It is sp^3d^2 hybridised and tetrahedral

C. It is d^2sp^3 hybridised and octahedral

D. It is dsp^2 hybridised and square planar

Answer: C

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544. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field ?

A. Na

B. K

C. Rb

D. Li

Answer: D

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545. The following equilibria are given by :

$N_2 + 3H_2 \Leftrightarrow 2NH_3, K_1$

$N_2 + O_2 \Leftrightarrow 2NO, K_2$

$H_2 + \frac{1}{2}O_2 \Leftrightarrow H_2O, K_3$

The equilibrium constant of the reaction $2NH_3 + \frac{5}{2}O_2 \Leftrightarrow 2NO + 3H_2O$ in terms of K_1, K_2 and K_3 is

A. $K_1K_3^3/K_2$

B. $K_2K_3^3/K_1$

C. K_2K_3/K_1

D. $K_2^3K_3/K_1$

Answer: B

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546. Which of the following reactions is appropriate for converting acetamide to methamine?

A. Carbylamine reaction

B. Hoffmann hypobromamide reaction

C. Stephens reaction

D. Gabriels phthalimide synthesis

Answer: B

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547. Mechanism of a hypothetical reaction

$X_2 + Y_2 \rightarrow 2XY$ is given below:

(i) $X_2 \rightarrow X + X$ (fast)

(ii) $X + Y_2 \Leftrightarrow XY + Y$ (slow)

(iii) $X + Y \rightarrow XY$ (fast)

The overall order of the reaction will be :

A. 1

B. 2

C. 0

D. 1.5

Answer: D

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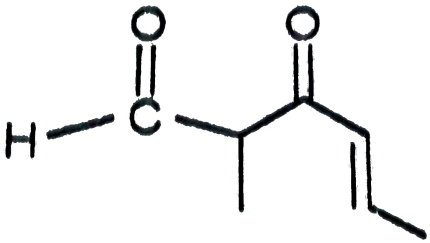
548. The IUPAC name of the compound



is _____

is_____

A. 3-keto-2-methylhex-4-enal

B. 5-formylhex-2-en-3-one

C. 5-methyl-4-oxohex-2-en-5-al

D. 3-keto-2-methylhex-5-enal

Answer: A

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549. Extraction of gold and silver involves leaching with CN^- ion.silver is later recovered by:

A. Liquation

B. Distillation

C. Zone refining

D. Displacement with Zn

Answer: D

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550. Correct order of -I effect is :

A. $-NR_3^+ > OR > F$

B. $F > -NR_3^+ > -OR$

C. $-NR_3^+ > F > OR$

D. $OR > -NR_3^+ > F$

Answer: C

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551. Aspirin can be prepared by the reaction of acetyl chloride with :

A. Benzoic acid

B. Phenol

C. p-hydroxy benzoic acid

D. o-hydroxy benzoic acid

Answer: D

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552. Which of the following does not given iodoform test :

A. 3-pentanone

B. 2-pentanone

C. Ethanol

D. Ethanal

Answer: A

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553. Which of the following statements is not compatible with arenes?

A. More stability

B. Resonance

C. Delocalization of π electrons

D. Electrophilic addition

Answer: D

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554. Which of the following is most sensitive towards electrophilic substitution?

A. 

B. 

C. 

D. 

Answer: A

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555. Which of the following does not give claisen condensation reaction :

A. $C_6H_5COOC_2H_5$

B. $C_6H_5CH_2COOC_2H_5$

C. $CH_3COOC_2H_5$

D. None of the above

Answer: A

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556. An organic compound contains $C = 40\,\%$, $H = 13.33\,\%$, and $N = 46.67\,\%$. Its empirical formula will be

A. CH_2N

B. C_2H_4N

C. CH_4N

D. CH_3N

Answer: C

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557. Glucose +x phenyl hydrazine → osazone 'x' will be :

A. 2

B. 3

C. 4

D. 1

Answer: B

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558. Which one is found only in RNA and not in DNA ?

A. Thymine

B. Adenine

C. Guanine

D. Cytosine

Answer: A

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559. 2-Bromo pentane reacts with ethanolic KOH gives main product :

A. Trans-2-pentene

B. Cis-2-pentene

C. 1-pentene

D. None of the above

Answer: A

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560. Which of the following does not give nucleophilic substitution with alcohol :

A. CH_3COCI

B. Acetic anhydride

C. Ether

D. None

Answer: C

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561. Aniline reacts with Br_2 water, $NaNO_2/HCL$ gives respectively :

A. p-Bromo aniline, p-chloro aniline

B. 2, 4, 6 tri bromo aniline, p-chloro aniline

C. 2, 4, 6 tri bromo aniline, Benzene diazonium chloride

D. p-bromo, aniline, Benzene diazonium chloride

Answer: C

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562. A complex compound which is formed by ligands nitrate and chloride. It gives two moles of AgCl precipitate with $AgNO_3$. What will be its formulae :

A. $\left[Co\left(NH_3\right)_5NO_3\right]Cl_2$

B. $\left[Co\left(NH_3\right)_5CI\right]NO_3Cl$

C. $\left[Co\left(NH_3\right)_4Cl_2\right]NO_3$

D. $\left[Co\left(NH_3\right)_4CINO_3\right]Cl$

Answer: A

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563. Which of the following molecule is not paramagnetic :

A. Cu^{++}

B. Fe^{2+}

C. CI^{-}

D. None of the above

Answer: C

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564. The number of antibonding electron pairs in O_2^{2-} molecular ion on the basic of molecular orbital theory is

A. 4

B. 3

C. 2

D. 1

Answer: A

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565. When A + Water → C + B, B is reacted with D, gas C again obtained. 'D' gives 'C' with H_2SO_4. B gives yellow colour with bunsen flame. C is a flamable gas then what would be A, B, C and D :

A. $K, H_2, NaOH, Zn$

B. $Na, NaOH, H_2, Zn$

C. $Li, H_2, LiOH, Zn$

D. None of the above

Answer: B

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566. The concentration of $ZnCl_2$ solution will change when it is placed in a container which is made of :

A. Al

B. Cu

C. Ag

D. None

Answer: A

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567. For the cell reaction,

$$Cu^{2+}\left(C_1\right)(aq.) + Zn(s) \rightarrow Zn^{2+}\left(C_2\right)(aq.) + Cu(s)$$

the change in free energy (ΔG) at a given temperature is a function of:

A. $\ln\left(C_1 + C_2\right)$

B. $\ln\frac{C_2}{C_1}$

C. $\ln C_2$

D. $\ln C_1$

Answer: B

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568. $A + B \Leftrightarrow C + D$ constant $= K_1$

$E + F \Leftrightarrow G + H$ Constent $= K_2$

then C + D + E + F $\Rightarrow$ product. The constant of reaction will be :

A. $\frac{K_1}{K_2}$

B. $\frac{K_2}{K_1}$

C. $K_1 K_2$

D. None of these

Answer: B

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569. Density of which of the following substance not decreases on adding in Br_2 vapours :

A. CCI_4

B. CS_2

C. Ether

D. Coke

Answer: D

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570. In which of the following molecule. The internuclear distance will be maximum :

A. CsI

B. CsF

C. LiF

D. LiI

Answer: A

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571. The fertilizer which makes the soil acidic :

A. $\left(NH_4\right)_2SO_4$

B. Super phosphate of lime

C. CH_3COONa

D. $Ca\left(NO_3\right)_2$

Answer: A

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572. The chiral centre is absent in :

A. DCH_2 - CH_2 - CH_2 - CI

B. CH_3 - CHD - CH_2 - CI

C. CH_3 - $CHCI$ - CH_2D

D. CH_3 - $CHOH$ - CH_2 - CH_3

Answer: A

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573. Number of isomers of $\left[Pt\left(NH_3\right)_4\right]\left[CuCI_4\right]$ complex are :

A. 2

B. 3

C. 4

D. 5

Answer: C

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574. ${}_{n}X^{m}$ emitted one α and 2β particles, then it will become :

A. ${}_{n}X^{m-4}$

B. ${}_{n-1}X^{m-1}$

C. ${}_{n}Z^{m-4}$

D. None

Answer: A

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575. When $X \rightarrow {}_{7}N^{14} + 2\beta^{-}$ then number of neutron will be in X :

A. 3

B. 5

C. 7

D. 9

Answer: D

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576. 1% solution of other compound is isotonic with 5% sucrose (sugar) solution. Then molecular wt. of compound will be :

A. 32.4

B. 68.4

C. 129.6

D. 34.2

Answer: B

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577. First ionization potential of Be and B will be :

A. 8.8 and 8.8

B. 6.6 and 6.6

C. 6.6 and 8.8

D. 8.8. and 6.6

Answer: D

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578. Which of the following gives colour with the water :

A. Cu^{+}

B. Cr^{3+}

C. Na^{+}

D. None

Answer: B

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579. Number of significant number will be in following numbers :

(a) 161 cm

(b) 0.0161

(c) 1.61

A. 3, 3, 3

B. 3, 4, 3

C. 3, 2, 3

D. 3, 4, 4

Answer: A

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580. Which one of the following is the major impurity in pig iron?

A. Mn

B. P

C. Graphite

D. S

Answer: C

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581. In the Schottky defect:

A. Same number of cation and decrease in anions

B. Cations and anions are replaces from their sites

C. Maximum number of cations and anions are same

D. None

Answer: A

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582. Maximum oxidation state will be of :

A. La

B. Gd

C. Eu

D. Am

Answer: D

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583. The IUPAC name of $\left[Co\left(NH_3\right)_3 ClBrNO_2\right]$ will be :

A. Triaminebromochloronitrocobaltate (III)

B. Triaminebromochloronitrocobalt (III)

C. Triaminebromonitrochlorocobalt (III)

D. Triaminenitrochlorocobalt (III)

Answer: B

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584. By which activation energy calculate :

A. At a constant temp.

B. At two different temp.

C. For reversible reaction

D. For volatile reaction

Answer: B

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585. Haemoglobin contains 0.33% of iron by weight. The molecular weight of heamoglobin is approximately 67200. The number of iron atoms (At. Wt. of Fe=56) present in one molecule of haemoglobin is

A. 1

B. 2

C. 3

D. 4

Answer: D

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586. $4NH_3 + 5O_2 \rightarrow 6H_2O + 4NO$

When one mole ammonia and one mole oxygen taken :

A. Oxygen is completely consumed

B. Ammonia is completely consumed

C. Both (1) and (2) are correct

D. No one is correct

Answer: A

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587. In PO_4^{3-} the formal charge on each O-atom and $P-O$ bond order respectively are .

A. 0.75 and 1.25

B. 0.5 and 2

C. 1 and 1.5

D. 0.75 and 2

Answer: A

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588. The radius of hydrogen shell is 0.53Å, then in first excited state radius of shell will be :

A. 2.12 Å

B. 1.06 Å

C. 8.5 Å

D. 4.24 Å

Answer: A

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589. Mole fraction of solute is 0.2 in solution then lowering in V.P $\Delta P = 10$. If lowering in V.P. $\Delta P = 20$ then mole fraction of solvent will be in solution :

A. 0.2

B. 0.4

C. 0.6

D. 0.8

Answer: C

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590. Uncertainity in position of a e^- and He is similar. If uncertainity in momentum of e^- is 32×10^5, then uncertainity in momentum of He will be :

A. 32×10^5

B. 16×10^5

C. 8×10^5

D. None of these

Answer: A

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591. The number of ATP molecules produced in the lipid metabolism of a molecules of palmitic acid is

A. 56

B. 36

C. 130

D. 86

Answer: C

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592. Identify the correct statement regarding entropy

A. At absolute zero of temperature, the entropy of all crystalline substances is taken to be zero

B. At absolute zero of temperature, the entropy of a perfectly crystalline substance is +ve

C. At absolute zero of temperature, entropy of a perfectly crystalline substance is taken to be zero

D. At $0^{\circ}C$, the entropy of a perfectly crystalline substance is taken to be zero

Answer: C

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593. The edge length of a face-centred cubic unit cell is $508\pm$. If the radius of the cation is $110\pm$ the radius of the anion is

A. 144 pm

B. 398 pm

C. 288 pm

D. 618 pm

Answer: A

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594. At the critical micelle concentration, the surfactant molecules :

A. Associate

B. Dissociate

C. Decompose

D. Become completely soluble

Answer: A

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595. Which one of the following pairs of substances on reaction will not not evolve H_2 gas?

A. Copper and HCl (aqueous)

B. Iron and steam

C. Iron and H_2SO_4 (aqueous)

D. Sodium and ethyl alcohol

Answer: A

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596. The second order Bragg diffraction of X rays with $\lambda = \text{Å}$ form a set of parallel planes in a metal occurs at an angle 60°. the distance between the scattering planes in the crystal is

A. 2.00 Å

B. 1.00 Å

C. 0.575 Å

D. 1.15 Å

Answer: D

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597. One mole of an ideal gas at $300K$ is expanded isothermally from an inital volume of 1 litre to 10 litres. The ΔE for this process is $\left(R = 2calmol^{-1}K^{-1}\right)$

A. 1381.1 cal.

B. Zero

C. 163.7 cal.

D. 9 lit. atm.

Answer: B

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598. On the basis of unit cell concept a crystal has :

A. 7 systems

B. 14 systems

C. 230 systems

D. 32 systems

Answer: A

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599. Phenyl acetylene reacts with dil. H_2SO_4 in presence of $HgSO_4$ gives

A. 

B. 

C. 

D. 

Answer: A

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600. According to Hardy - Schulze rule, the coagulating power of cation follows the order :

A. $Na^{+} > Ba^{+2} > Al^{+3}$

B. $Al^{+3} > Ba^{+2} > Na^{+}$

C. $Ba^{+2} > Al^{+3} > Na^{+}$

D. $Al^{+3} > Na^{+} > Ba^{+2}$

Answer: B

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601. Which of the following compound gives p- cresol with p-methyl diazonium chloride :

A. H_2O

B. H_3PO_2

C. HCOOH

D. C_6H_5OH

Answer: A

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602. Mole ratio of H_2 and O_2 gas is 8 : 1 what will be the ratio of wt. :

A. $1:1$

B. $2:1$

C. $4:1$

D. $1:2$

Answer: D

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603. The ionization energy of H-atom is $13.6eV$. Calculate the is ionization energy of Li^{+2}ion-

A. 122.4 eV

B. 40.8 eV

C. 30.6 eV

D. 13.6 eV

Answer: C

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604. Which of the following electronic configuration will have maximum I.P. difference between II and III I.P. :

A. $1s^2 2s^2 2p^6 3s^1$

B. $1s^2 2s^2 2p^6 3s^2$

C. $1s^2 2s^2 2p^6$

D. $1s^2 2s^2 2p^5$

Answer: B

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605. The concentration of a solution is changed from 0.2 to 0.4, then what will be rate and rate constant. The reaction is of first order and rate constant is $K = 1 \times 10^{-6}$:

A. $2 \times 10^{-7}, 1 \times 10^{-6}$

B. $1 \times 10^{-7}, 1 \times 10^{6}$

C. $4 \times 10^{-7}, 1 \times 10^{-6}$

D. $2 \times 10^{-3}, 1 \times 10^{-3}$

Answer: C

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606. Half life of a radioactive sample is 4 days. After 16 days how much quantity of matter remain undecayed :

A. $\frac{1}{4}$

B. $\frac{1}{8}$

C. $\frac{1}{16}$

D. $\frac{1}{32}$

Answer: C

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607. Identify structure of trans-2-hexenal.

A. 

B. 

C. 

D. None of the above

Answer: B

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608. Which of the following gives ethyl benzene with phenyl methyl ketone :

A. Zn–Hg+HCl

B. $LiAlH_4$

C. $KMnO_4$

D. None of the above

Answer: A

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609. Acetaldehyde reacts with semicarbazide product will be

A. $CH_3CH = \mathbb{N}H- CO- NH_2$

B. $CH_3CH = NCONHNH_2$

C. $CH_3CH = NHNH_2$

D. $CH_3 - \overset{O}{\overset{||}{C}} - NH - CONH_2$

Answer: A

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610. Cynohydrin of the following compound on hydrolysis gives optically active product :

A. HCHO

B. CH_3CHO

C. CH_3COCH_3

D. All of the above

Answer: B

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611. Which of the following is a chiral compound :

A. 2-methyl pentanoic acid

B. 3-methyl pentanoic acid

C. 4-methyl pentanoic acid

D. None of these

Answer: A::B

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612. Compound $'A'$ on chlorination gives compound $'B'$, compound $'B'$ reacts with alc. KOH gives gas $'C'$, which decolourise Baeyer reagent. Ozonolysis of compound $'C'$ gives only $HCHO$ compound $'A'$ is:

A. C_2H_6

B. C_2H_4

C. C_4H_{10}

D. C_2H_5Cl

Answer: A

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613. Structure of (monomer unit of) natural rubber is:

A. $CH_3 - \overset{|}{C}CH_3 = CH - CH_3$

B. $CH_3 - CH = CH - CH_3$

C. $CH_2 = \overset{|}{C}CH_3 - CH = CH_2$

D. $CH_2 = \overset{|}{C}CH_3 - \overset{|}{C}CH_3 = CH_2$

Answer: C

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614. Which of the following compound contain zero oxidation state of Fe :

A. $\left[Fe(CN)_6\right]^{-4}$

B. $\left[Fe(CN)_6\right]^{-3}$

C. $Fe(CO)_5$

D. All of the above

Answer: C

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615. A compound contains $C = 40\,\%$, $O = 53.5\,\%$, and $H = 6.5\,\%$ the empirical formula formula of the compound is:

A. CH_2O

B. CH_4O

C. CH_4O_2

D. CHO

Answer: A

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616. $\left[Cu\left(NH_3\right)_4\right]^{+2}$ reacts with HNO_3 in excess of water gives :

A. $Cu(OH)_2$

B. $Cu\left(NO_3\right)_2$

C. $Cu\left(H_2O\right)^{-2}$

D. None of the above

Answer: B

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617. Cr in $\left[Cr\left(NH_3\right)_6\right]Br_3$ has number of unpaired electron :

A. 4

B. 3

C. 1

D. 2

Answer: B

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618. Sucrose on hydrolysis gives:

A. L(+) Glucose + D(+) Fructose

B. L(–) Glucose + L(–) Fructose

C. D(+) Glucose + D(–) Fructose

D. D(+) Glucose + L(–) Fructose

Answer: C

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619. Which of the following comp. is coloured and has unpaired electron :

A. CuF_2

B. $K_2Cr_2O_7$

C. $KMnO_4$

D. $K_4\left[Fe(CN)_6\right]$

Answer: A

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620. Which of the following does not reduce Fehling solution :

A. Glucose

B. Fructose

C. Sucrose

D. Maltose

Answer: C

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621. O.N. of P in pyrophosphoric acid is

A. $+5$

B. $+2$

C. $+3$

D. $+4$

Answer: A

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622. Which of the following example behave as a lewis acid $BF_3, SnCl_2, SnCl_4$:

A. Stenus chloride, stenic chloride

B. BF_3, stenus chloride

C. Only BF_3

D. BF_3, stenus chloride, stenic chloride

Answer: D

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623. In which of the following comp. H atom is directly linked with phosphorus

A. H_3PO_2

B. H_3PO_3

C. H_3PO_4

D. $H_4P_2O_7$

Answer: A::B

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624. In the balanced reaction : $aNO_3^- + bCI^- + cH^+ \rightarrow dNO + eCI_2 + fH_2O$

a, b, c, d, e and f are lowest possible integers. The value of $a + b$ is :

A.

a	b	c	d	e	f
2	4	6	8	4	2

B.

a	b	c	d	e	f
1	4	10	3	1	4

C.

a	b	c	d	e	f
4	1	10	1	3	4

D.

a	b	c	d	e	f
10	4	1	3	4	2

Answer: C

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625. Determine the value of E^0 cell for the following reaction

$Cu^{+2} + Sn^{+2} \rightarrow Cu + Sn^{+4}$

Equilibrium constant is 10^6

$Cu^{++} + Sn^{++} \rightarrow Cu + Sn^{+4}$

A. 0.1773

B. 0.01773

C. 0.2153

D. 1.773

Answer: A

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626. What will be the H^+ con when 4 gm NaOH dissolved in 1000 ml. of water

A. 10^{-1}

B. 10^{-13}

C. 10^{-4}

D. 10^{-10}

Answer: B

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627. What is true for a cyclic process

A. W=0

B. $\Delta E = 0$

C. $\Delta H = 0$

D. $\Delta E \neq 0$

Answer: B::C

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628. Increasing order of bond length is

A. $NO^- < NO < NO^+ < O_2^-$

B. $O_2^- < NO < NO^- < O^+$

C. $O_2^- < NO^- < NO < NO^+$

D. $NO^+ < NO < NO^- < O_2^-$

Answer: D

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629. A system is expanded under adiabatic process

A. Temp. increase

B. ΔE decreases

C. ΔE increases

D. None of these

Answer: B

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630. Which of the following is true for a reaction in which all the reactant & product are liquids

A. $\Delta H = \Delta E$

B. $\Delta H = \Delta W$

C. $\Delta H > \Delta E$

D. None of the above

Answer: A

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631. Clemenson's reaction is :

A. 

B. C_6H_5 - $COCH_3$ + NH_2NH_2 $\xrightarrow{C_2H_5ON}$ $C_6H_5CH_2CH_3$

C. $CH_3COCH_3 + 4HI \xrightarrow{Red.P.} CH_3CH_2CH_3$

D. All of the above

Answer: A

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632. Which of the following reaction gives by isocyanide

A. Rimer Tieman reaction

B. Carbyl amine reaction

C. Hoffmann bromamide reaction

D. None of the above

Answer: B

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633. In a gaseous mixture which of NO_2, CO_2 and N_2O gases have same rate of diffusion

A. NO_2, CO_2

B. CO_2, N_2O

C. NO_2, N_2O

D. All

Answer: B

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634. Compound 'A' in acidic medium does not give ppt with H_2S but in NH_4OH medium gives a ppt comp. 'A' is

A. $FeCl_3$

B. $AlCl_3$

C. $ZnCl_2$

D. $SnCl_2$

Answer: C

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635. FeCr_2O_7 " react with " Na_2CO_3` gives the product:

A. Na_2CrO_4

B. $Na_2Cr_2O_7$

C. Fe_3O_4

D. FeO

Answer: A

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636. A compound BA_2 has $K_{sp} = 4 \times 10^{-12}$ solubility of this comp. will be :

A. $10^{-(3)}$

B. 10^{-4}

C. 10^{-5}

D. 10^{-6}

Answer: B

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637. H_2O_2 on oxidation gives:

A. O^{-2}

B. OH^-

C. O_2^-

D. O_2

Answer: D

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638. What is false for mole fraction

A. $X < 1$

B. $-2 \leq X \leq 2$

C. $0 \leq X \leq 1$

D. Always non negative

Answer: B

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639. MgO and NaCl has similar structure. In MgO magnesiuem is surrounded by how many oxygen atoms

A. 2

B. 4

C. 6

D. 1

Answer: C

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640. General behaviour of O_3 is

A. Gives electrons

B. Gives O_2

C. Reaction with H_2

D. Accept electrons

Answer: B

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641. How many ATP will be formed by oxidation of 1 mole glucose

A. 36

B. 40

C. 24

D. 32

Answer: A

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642. 400 ml gas at 500 torr and 666.6 ml gas at 600 torr taken in a container of 3 litre then the total pressure of mixture

A. 200 torr

B. 400 torr

C. 600 torr

D. 50 torr

Answer: A

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643. Which of the following is steroid harmones

A. Progesterone

B. Cholesterole

C. ACTH

D. Adrenaline

Answer: A

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644. The dipole moment of compound AB is 10.92 D and that of compound CD is 12.45 D. The bond length AB is 2.72 Å and that of CD is 2.56 Å then for these compound true statement is

A. More ionic nature in AB

B. More ionic nature in CD

C. Equal in both

D. Not predicted

Answer: B

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645. The bombarment of α - particle on ${}_7N^{14}$, emits proton then new atom will be :

A. ${}_8O^{17}$

B. ${}_8O^{16}$

C. ${}_6C^{14}$

D. Ne

Answer: A

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646. Half life of a substance is 77 days then its decay constant will be :

A. 0.9

B. 0.09

C. 0.009

D. 0.013

Answer: C

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647. Number of base pairs in human chromosomes

A. 3×10^9

B. 3×10^7

C. 6×10^8

D. 6×10^7

Answer: A

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648. Amount of CO_2 fixed annually is about

A. 7×10^{23} ton

B. 7×10^{13} ton

C. 7×10^{10} ton

D. 7×10^{11} ton

Answer: D

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649. Identify the correct statement for change of Gibbs energy for a system $\left(\Delta G_{system}\right)$ at constant temperature and pressure:-

A.) If ΔG_{system} gt 0, the process is spontaneous

B. If ΔG_{system} = 0, the system has attained equilibrium

C. If ΔG_{system} = 0, the system is still moving in a particular direction

D. If ΔG_{system} lt 0, the process is not spontaneous

Answer: B

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650. A solution containing 10 g per dm^3 of urea (molecular mass = 60 g mol^{-1}) is isotonic with a 5% solution of a nonvolatile solute. The

molecular mass of this nonvolatile solution is:

A. 250 g mol^{-1}

B. 300 g mol^{-1}

C. 350 g mol^{-1}

D. 200 g mol^{-1}

Answer: B

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651. A plot of log x/m versus log p for the adsorption of a gas on a solid gives a straight line with slope equal to:

A. – log K

B. n

C. $\frac{1}{n}$

D. Log K

Answer: C

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652. Assume each reaction is carried out in an open container. For which reaction will $\Delta H = \Delta E$?

A. $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$

B. $C(s) + 2H_2O(g) \rightarrow 2H_2(g) + CO_2(g)$

C. $PCl_5(g) \rightarrow PCl_3(g) + Cl_2(g)$

D. $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$

Answer: A

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653. In a set of reactions, propionic acid yielded a compound (D).

$$CH_3CH_2COOH \xrightarrow{SOCl_2} (B) \xrightarrow{NH_3} (C) \xrightarrow{KOH} Br_2(D)$$

The structure of (D) would be:

A. $CH_3CH_2CH_2NH_2$

B. $CH_3CH_2CHONH_2$

C. $CH_2CH_2NHCH_3$

D. $CH_3CH_2NH_2$

Answer: D

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654. During the process of digestion, the proteins present in food materials are hydrolysed to amino acids. The two enzymes involved in the process: $\text{Proteins} \xrightarrow{\text{Enzyme(A)}} \text{Polypeptides} \xrightarrow{\text{Enzyme(B)}} \text{Amino acids}$ are respectively-

A. Amylase and Maltase

B. Diastase and Lipase

C. Pepsin and Trypsin

D. Invertase and Zymase

Answer: C

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655. The human body does not produce:-

A. DNA

B. Vitamin

C. Hormones

D. Enzymes

Answer: B

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656. $CsBr$ crystallises in a body - centred cubic lattice. The unit cell length is $436.66pm$. Given that : the atomic mass of $Cs = 133$ and that of $Br = 80gram$ and Avogadro's number being $6.02 \times 10^{23}mol^{-1}$, the density of $CsBr$ is :

A. $42.5\frac{g}{c}m^3$

B. $0.425\frac{g}{c}m^3$

C. $8.25\frac{g}{c}m^3$

D. $4.25\frac{g}{c}m^3$

Answer: D

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657. More number of oxidation states are exhibited by the actinoids than by the lanthonoids. The main reason for this is:- (

A. More energy difference between 5f and 6d orbitals than that between 4f and 5d orbitals

B. Lesser energy difference between 5f and 6d orbitals than between 4f and 5d orbitals

C. Greater metallic character of the lanthanoids than that of the corresponding actinoids

D. More active nature of the actinoids

Answer: B

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658. Given: The mass of electron is 9.11×10^{-31}Kg Planck constant is 6.626×10^{-34}Js, the uncertainty involved in the measurement of velocity within a distance of 0.1Å is:-

A. $5.79 \times 10^{6} ms(-1)$

B. $5.79 \times 10^{7} ms^{9} - 1)$

C. $5.79 \times 10^{8} ms^{-1}$

D. $5.79 \times 10^{5} ms^{-1}$

Answer: A

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659. Copper sulphate dissolved in excess of KCN to give:-

A. CuCN

B. $\left[Cu(CN)_4\right]^{3-}$

C. $\left[Cu(CN)_4\right]^{2-}$

D. $Cu(CN)_2$

Answer: B

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660. In which of the following pairs are both the ions coloured in aqueous solution-

A. Ni^{2+}, Ti^{3+}

B. Sc^{3+}, Ti^{3+}

C. Sc^{3+}, Co^{2+}

D. Ni^{2+}, Cu^{+}

Answer: A

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661. Al_2O_3 can be converted to anhydrous $AlCl_3$ by heating

A. Al_2O_3 with HCl gas

B. Al_2O_3 with NaCl in solid state

C. A mixture of Al_2O_3 and carbon in dry Cl_2 gas

D. Al_2O_3 with Cl_2 gas

Answer: C

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662. The enthalpy and entropy change for the reaction: $Br_2(l) + Cl_2(g)$ to`2BrCl(g)

are 30 kJ mol–1 and 105 JK–1 mol–1 respectively. The temperature at which the reaction will be in equilibrium is:-

A. 285.7K

B. 273 K

C. 450 K

D. 300 K

Answer: A

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663. The appearance of colour in solid alkali metal halides is generally due to

A. F-centres

B. Schottky defect

C. Frenkel defect

D. Interstitial positions

Answer: A

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664. The general molecular formula, which represents the homologous series of alkanols is

A. $C_nH_{2n}O_2$

B. $C_nH_{2n}O$

C. $C_nH_{2n+1}O$

D. $C_nH_{2n+2}O$

Answer: D

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665. If $E^{\circ}_{Fe^{2+}/Fe} = -0.441V$

and $E^{\circ}_{Fe^{3+}/Fe^{2+}} = 0.771V$

The standard EMF of the reaction

$Fe + 2Fe^{3+} \rightarrow 3Fe^{2+}$

will be:

A. 0.330 V

B. 1.653 V

C. 1.212 V

D. 0.111 V

Answer: C

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666. for the reaction, $2A + B \rightarrow 3C + D$, which of the following does not express the reaction rate

A. $-\frac{d[C]}{3dt}$

B. $-\frac{d[B]}{dt}$

C. $\frac{d[D]}{dt}$

D. $-\frac{d[A]}{2dt}$

Answer: A

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667. For the reaction $CH_{4(g)} + 2O_{2(g)} \Leftrightarrow CO_{2(g)} + 2H_2O_l$: ($\Delta H = -170.8 kJmol^{-1}$). Which of the following statement is not true?

A. At equilibrium, the concentrations of $CO_2(g)$ and $H2_O(l)$ are not equal

B. The equilibrium constant for the reaction is given by K_P =

$$\frac{[C0_2]}{[CH_4][O_2]}$$

C. Addition of $CH_4(g)$ or $O_2(g)$ at equilibrium will cause a shift to the right

D. The reaction is exothermic

Answer: B

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668. $\sim\left[NH\left(CH_2\right)NHCO\left(CH_2\right)_4CO\right]\sim$ is a

A. copolymer

B. Addition polymer

C. Thermosetting polymer

D. Homopolymer

Answer: A

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669. A carbonyl compound reacts with hydrogen cyanide to form cyanohydrin which on hydrolysis forms a recemic mixrture of α-hydroxy acid. The carbonyl compound D.

A. Acetaldehyde

B. Acetone

C. diethyl ketone

D. Formaldehyde

Answer: A

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670. Which one of the following is a peptide hormone ?

A. Glucagon

B. Testosterone

C. Thyroxin

D. Adrenaline

Answer: A

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671. The major organic product in the reaction

$CH_3 - O - CH\left(CH_3\right)_2 + HI \rightarrow$ product is

A. CH3OH + (CH3)2CHI

B. $ICH_2OCH\left(CH_3\right)_2$

C. $CH_3OC \mid I\left(CH_3\right)_2$

D. CH_3CHO

Answer: D

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672. Nucleophilic addition reaction will be most favoured in

A. $CH_3CH_2 - CH_2 \overset{\overset{O}{||}}{C} - CH_3$

B. $\left(CH_3\right)_2 C = O$

C. CH_3CH_2CHO

D. CH_3CHO

Answer: D

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673. The enthalpy of hydrogenation of cyclohexene is $-119.5 kJmol^{-1}$. If resonance energy of benzene is $-150.4 kJmol^{-1}$, its enthalpy of hydrogenation would be :

A. –508.9 kJ mol^{-1}

B. –208.1 kJ mol^{-1}

C. –269.9 kJ mol^{-10}

D. –358.5 kJ mol^{-1}

Answer: B

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674. Self-condensation of two moles of ethyl acetate in presence of sodium ethoxide yields

A. Ethyl butyrate

B. Acetoacetic ester

C. Methyl acetoacetate

D. Ethyl propionate

Answer: B

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675. Consider the reaction:

$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$.

The equally relationship between $-\frac{d[NH_3]}{dt}$ and $-\frac{d[H_2]}{dt}$ is:

A. $\frac{d[NH_3]}{dt} = -\frac{1}{3}\frac{d[H_2]}{dt}$

B. $+\frac{d[NH_3]}{dt} = -\frac{1}{3}\frac{d[H_2]}{dt}$

C. $+\frac{d[NH_3]}{dt} = -\frac{3}{2}\frac{d[H_2]}{dt}$

D. $+\frac{d[NH_3]}{dt} = -\frac{d[H_2]}{dt}$

Answer: B

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676. Which of the following is not chiral?

A. 2-Butanol

B. 2,3-Dibromopentane

C. 3-Bromopentane

D. 2-Hydroxypropanoic acid

Answer: C

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677. $\left[Co\left(NH_3\right)_4\left(NO_2\right)_2\right]CI$ exhibits

A. Linkage isomerism, ionization isomerism and optical isomerism

B. Linkage isomerism, ionization isomerism and geometrical isomerism

C. Ionization isomerism, geometrical isomerism and optical isomerism

D. Ionization isomerism, geometrical isomerism and optical isomerism

Answer: B

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678. $\left[Cr\left(H_2O\right)_6\right]Cl_3$ (at no. of Cr = 24) has a magnetic moment of $3.83B.M.$ The correct distribution of $3d$ electrons the chromium of the complex.

A. $\left(3dx^2-y^2\right)^1, 3dZ^{2^1}, 3dxz^1$

B. $3dxy^1, \left(3dx2^2-y^2\right)^1, 3dyz^1$

C. $3dxy^1, 3dyz^1, 3dxz^1$

D. $3dxy^1, 3dyz^1, 3dz^{2^1}$

Answer: C

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679. 1.00 g of a non-electrolyte solute (molar mass 250g mol^{-1}) was dissolved in 51.2 g of benzene. If the freezing point depression constant K_f of benzene is 5.12 K kg mol^{-1}, the freezing point of benzene will be lowered by:-

A. 0.4 K

B. 0.3 K

C. 0.5 K

D. 0.2 K

Answer: A

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680. Which of the following constitutes a buffer ?

A. $HNO_2 \& NaNO_2$

B. NaOH & NaCl

C. $HNO_3 \& NH_4NO_3$

D. HCl & KCl

Answer: A

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681. The hydrogen ion concentration of a $10^{-8}MHCl$ aqueous soultion at $298K\left(K_w = 10^{-14}\right)$ is

A. $1.0 \times 10^{-6}M$

B. $1.0525 \times 10^{-7}M$

C. $9.525 \times 10^{-8}M$

D. $1.0 \times 10^{-8}M$

Answer: B

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682. A solution of acetone in ethnol

A. Shows a negative deviation from Raoult's law

B. Shows a positive deviation from Raoult's law

C. Behaves like a near ideal solution

D. Obeys Raoult's law

Answer: B

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683. A hypothetical electrochemical cell is shown below.

$$A\left|A^{+}(xM)\right|\left|B^{+}(yM)\right|B^{+}$$

The e.m.g. measured is 0.20V the cell reaction is

A. $A^{+}+B \rightarrow A+B^{+}$

B. $A^{+}+e^{-} \rightarrow A, B^{+}+e^{-} \rightarrow B$

C. The cell reaction cannot be predicted

D. $A + B^+ \rightarrow A^+ + B$

Answer: D

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684. Ethylene oxide when treated with Grignard reagent yields

A. Secondary alcohol

B. Tertiary alcohol

C. Cyclopropyl alcohol

D. Primary alcohol

Answer: D

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685. During osmosis, flow of water through a semipermeable membrane is:

A. From solution having higher concentration only

B. Form both sides of semipermeable membrane with equal flow rates

C. From both sides of semipermeable membrane with unequal flow rates

D. From solution having lower concentration only

Answer: C

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686. Which of the following is more basic than aniline?

A. Diphenlamine

B. Triphenylamine

C. p-Nitroaniline

D. Benzylamine

Answer: D

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687. In which of the following molecules all the bonds are not equal:-

A. CIF_3

B. BF_3

C. AlF_3

D. NF_3

Answer: A

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688. The electronegaivity difference between N and F is greater than that between N and H yet the dipole moment of NH_2 (1 .5 D) is larger than that of $NF_3(0.\ 2D)$. This is because :

A. In NH_3 as well as in NF_3 the atomic dipole and bond dipole are in the same direction

B. In $NH_3$the atomic dipole and bond dipole are in the same direction whereas in NF_3 these are in opposite directions

C. In NH_3 as well as NF_3 the atomic dipole and bond dipole are in opposite directions

D. In NH_3 the atomic dipole and bond dipole are in the opposite directions whereas in NF_3 these are in the same direction

Answer: B

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689. The correct order of mobility of alkali metal ions in aqueous solution is

A. $Li^+ > Na^+ > K^+ > Rb^+$

B. $Na^+ > K^+ > Rb^+ > Li^+$

C. $K^+ > Rb^+ > Na + > Li^+$

D. $Rb^+ > K^+ > Na^+ > Li^+$

Answer: D

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690. The correct order regarding the electronegativity of hybrid orbitals of carbon is:-

A. $sp > sp^2 < sp^3$

B. $sp > sp^2 > sp^3$

C. $sp < sp^2 > sp^3$

D. $sp < sp^2 < sp^3$

Answer: B

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691. Which of the following species has a linear shape?

A. NO_2^-

B. SO_2

C. NO_2^+

D. O_3

Answer: C

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692. Which of the follwing is the most basic oxide?

A. Al_2O_3

B. Sb_2O_3

C. Bi_2O_3

D. SeO_2

Answer: C

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693. The orientation of an atomic orbital is governed by :

A. Azimuthal quantum number

B. Spin quantum number

C. Magnetic quantum number

D. Principal quantum number

Answer: C

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694. Which of the following is not a correct statement:-

A. The electron-deficient molecules can act as Lewis acids (

B. The canonical structures have no real existence

C. Every AB5 molecule does infact have square pyramid structure

D. Multiple bonds are always shorter than corresponding single bonds

Answer: C

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695. The number of unpaired electrons in a parmamagnetic diatomic molecule of an element with atomic number 16 is :

A. 2

B. 3

C. 4

D. 1

Answer: A

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696. Which one of the following orders is not in according with the property stated against it ?

A. $F_2 > Cl_2 > Br_2 > I_2$, oxidising power

B. HI gt HBr gt HCl gt HF, acidic property in water

C. $F_2 > Cl_2 > Br_2 > I_2$, Electronegativity

D. $F_2 > Cl_2 > Br_2 > I_2$, Bond dissociation energy

Answer: D

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697. Which of the following is not isostructural with $SiCI_4$?

A. SCl_4

B. SO_4^{2-}

C. PO_4^{3-}

D. NH_4^+

Answer: A

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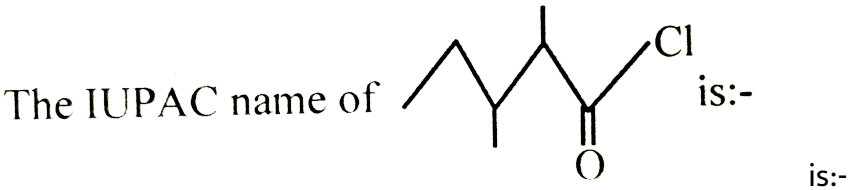
698. The IUPAC name of



is:-

A. 3,4-dimethylpentanoyl chloride

B. 1-chloro-1-oxo-2,3-dimethylpentane

C. 2-ethyl-3-methylbutanoyl chloride

D. 2,3-dimethylpentanoyl chloride

Answer: D

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MCQ

1. In a zero-order reaction for every 10° rise of temperature, the rate is doubled. If the temperature is increased from $10^\circ C$ to $100^\circ C$, the rate of the reaction will become

A. 64 times

B. 128 times

C. 256 times

D. 512 times

Answer: D

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2. Which of the following pairs is isostractural (i.e having the same shape and hybridization ?

A. $\left[NF_3 \text{ and } BF_3\right]$

B. $\left[BF_4^- \text{ and } NH_4^+\right]$

C. $\left[BCl_3 \text{ and } BrCl_3\right]$

D. $\left[NH_3 \text{ and } NO_3^-\right]$

Answer: B

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3. In which of the following reactions,standard reaction entropy change $\left(\Delta S^\circ\right)$is positive and standard Gibb,s energy change $\left(\Delta G^\circ\right)$decreases

sharply with increasing temperature?

A. $Mg(s) + \frac{1}{2}O_2(g) \rightarrow MgO(s)$

B. $\frac{1}{2}C$ graphite $+ \frac{1}{2}O_2(g) \rightarrow \frac{1}{2}CO_2(g)$

C. C graphite $+ \frac{1}{2}O_2(g) \rightarrow CO(g)$

D. $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g)$

Answer: C

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4. In a reaction , $A + B \rightarrow$ Product, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentration of both the reactants (A and B) are doubled, rate law for the reaction can be written as

A. Rate=k[A][B]

B. Rate $= k[A]^2[B]$

C. Rate $k[A][B]^2$

D. Rate $= k[A]^2[B]^2$

Answer: B

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5. Limiting molar conductivity of NH_4OH [i.e., $\Lambda_m^\circ\left(NH_4OH\right)$] is equal to:

A. $A_m^\circ\left(NH_4OH\right) + A_m^\circ\left(NH_4Cl\right) - A_m^\circ(HCl)$

B. $A_m^\circ\left(NH_4Cl\right) + A_m^\circ(NHOH) - A_m^\circ(NaCl)$

C. $A_m^\circ\left(NH_4Cl\right) + A_m^\circ(NaCl) - A_m^\circ(NaOH)$

D. $A_m^\circ(NAOH) + A_m^\circ(NaCl) - A_m^\circ\left(NH_4Cl\right)$

Answer: B

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6. Which of the following species contains three bond pair and one lone pair around the central atom ?

A. NH_2^-

B. PCl_3

C. H_2O

D. BF_3

Answer: B

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7. Buffer solutions have constant acidity and alkalinity because

A. They have large excess of H^+ or OH^- ions

B. They have fixed value of pH

C. These give unionised acid or base on reaction with added acid or alkali

D. Acids and alkalies in these solutions are shielded from attack by other ions

Answer: C

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8. In freundlich adsorption isotherm, the value of 1/n is :

A. 1 in case of physical adsorption

B. 1 in case of chemisorption

C. between 0 and 1 in all cases

D. between 2 and 4 in all cases

Answer: C

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9. pH of saturated solution of $Ba(OH)_2$ is 12. The value of solubility product $\left(K_{sp}\right)$ of $Ba(OH)_2$ is

A. 4.0×10^{-6}

B. 5.0×10^{-6}

C. 3.3×10^{-7}

D. 5.0×10^{-7}

Answer: D

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10. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from

A. Zero to -1 and zero to +3

B. Zero to +1 and zero to -3

C. Zero to +1 and zero to -5

D. Zero to -1 and zero to +5

Answer: D

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11. Which one of the following statements is incorrect about enzyme catalysis?

A. Enzymes are denaturated by ultaraviolet rays and at high temperature

B. Enzymes are least reactive at optimum temperature

C. Enzymes are mostly proteinous in nature

D. Enzyme action is specific

Answer: B

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12. P_A and P_B are the vapour pressure of pure liquid components ,Aand B respectively of an ideal binary solution,If x_A represents the mole fraction of component A, the total pressure of the solution will be

A. $P_B + X_A\left(P_B - P_A\right)$

B. $P_B + X_A\left(P_A - P_B\right)$

C. $P_A + X_A\left(P_B - P_A\right)$

D. $P_A + X_A\left(P_A - P_B\right)$

Answer: B

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13. The protcting power of lyophilic colloidal solution is expressed in terms of

A. Critical miscelle concentration

B. Oxidation number

C. Coagulation value

D. Gold number

Answer: D

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14. Maximum number of electrons in a sub-shell with $l = 3$ and $n = 4$ is.

A. 10

B. 12

C. 14

D. 16

Answer: C

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15. $50mL$ of each gas A and of gas B takes 150 and 200 seconds respectively for effusing through a pin hole under the similar conditon. If molecular mass of gas B is 36, then the molecular mass of gas A will be

A. 32

B. 64

C. 96

D. 128

Answer: B

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16. Standard enthalpy of vaporisation$\Delta V_{vap}.H^{\Theta}$ for water at $100^{\circ}C$is $40.66kJmol^{-1}$.The internal energy of Vaporization of water at $100^{\circ}C\left(\text{in kJ mol}^{-1}\right)$is

A. $+43.76$

B. $+40.66$

C. $+37.56$

D. -43.76

Answer: C

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17. The total number of octahedral void (s) per atom present in a cubic close packed structure is

A. 2

B. 4

C. 1

D. 3

Answer: C

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18. Correct set of four quantum numbers for the valence (outermost) electron of rubidium $(Z = 37)$ is

A. $5, 0, 0, +\frac{1}{2}$

B. $5, 1, 0, +\frac{1}{2}$

C. $5, 1, 1, +\frac{1}{2}$

D. $6, 0, 0, +\frac{1}{2}$

Answer: A

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19. a metal crystallizes with a face-centered cubic lattice.The edge of the unit cell is 408 pm. The diameter of the metal atom is :

A. 144 pm

B. 204 pm

C. 288 pm

D. 408 pm

Answer: C

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20. The enthalpy of fusion of water is $1.435 kcal/\text{mole}$. The molar entropy change for melting of ice at $0^\circ C$ is

A. 5.260 cal/(mol K)

B. 0.526 cal / (mol K)

C. 10.52 cal / (mol K)

D. 21.04 cal/(mol K)

Answer: A

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21. In which of the following compounds,nitrogen exhibits highest oxidation state?

A. N_3H

B. NH_2OH

C. N_2H_4

D. NH_3

Answer: A

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22. Aluminum is exteracted from alumine AI_2O_3 by electrolysis of a molten mixture of :

A. $Al_2O_3 + Na_3AlF_6 + CaF_2$

B. $Al_2O_3 + KF + Na_3AlF_6$

C. $Al_2O_3 + HF + NaAlF_4$

D. $Al_2O_3 + CaF_2 + NaAlF_4$

Answer: A

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23. Which of the statements is not true ?

A. $K_2Cr_2O_7$ solution in acidic medium is orange

B. $K_2Cr_2O_7$ solution becomes yellow on increasing the pH beyond 7

C. On passing H_2S through acidified $K_2Cr_2O_7$ solution, a milky colour is observed

D. $Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric analysis

Answer: D

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24. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number?

A. Cl

B. C

C. S

D. H

Answer: A

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25. Which one of the following is an outer orbital complex and exhibits paramagnetic behaviour ?

A. $\left[Cr\left(NH_3\right)_6\right]^{3+}$

B. $\left[Co\left(NH_3\right)_6\right]^{3+}$

C. $\left[Ni\left(NH_3\right)_6\right]^{2+}$

D. $\left[Zn\left(NH_3\right)_6\right]^{2+}$

Answer: C

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26. The ease of adsorption of the hydrated alkali metal ions on ion-exchange resins follows the order:

A. $K^+ < Na^+ < Rb^+ < Li^+$

B. $Na^+ < Li^+ < K^+ < Rb^+$

C. $Li^+ < K^+ < Na^+ < Rb^+$

D. $Rb^+ < K^+ < Na^+ < Li^+$

Answer: D

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27. Equimolar solutions of the following substances were prepared separately. Which one of these will record the highest pH value?

A. LiCl

B. $BeCl_2$

C. $BaCl_2$

D. $AlCl_3$

Answer: C

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28. Sulphur trioxide can be obtained by which of the following reactions :

A. $S + H_2SO_4 \xrightarrow{\Delta}$

B. $H_2SO_4 + PCl \xrightarrow{\Delta}$

C. $CaSO_2 + C \xrightarrow{\Delta}$

D. $Fe_2 + \left(SO_4\right)_3 \xrightarrow{\Delta}$

Answer: D

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29. In the exteraction of copper from its sulphide ore, the metal is fanally obtained by the reduction of caprous oxide with

A. Iron sulphide (FeS)

B. Carbon monoxide (CO)

C. Copper (1) sulphide $\left(Cu_2S\right)$

D. Sulphur dioxide $\left(SO_2\right)$

Answer: C

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30. Identify the wrong statement in the following ?

A. Atomic radius of the elements increases as one moves down the first group of the periodic table

B. Atomic radius of the elements decreases as one moves across from left to right in then 2^{nd} period of the periodic table

C. Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius

D. Amongst isoelectronic species, greater the negative charge on the anion, large is the ionic radius

Answer: C

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31. Which of the following statement is not valid for oxoaids of phosphorus?

A. All oxoacids contain tetrahedral four coordinated phosphorous

B. All oxoacids contain atleast one P=O units and one P- OH group

C. Orthophosphoric acid is used in the manufacture of tripie superphosphate

D. Hypophosphorous acid is a diprotic acid

Answer: D

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32. Identify the alloy containing a non metal as a constitunt in it

A. Bell metal

B. Bronze

C. Invar

D. Steel

Answer: D

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33. The pair of species with the same bond order is :

A. NO, CO

B. N_2, O_2

C. O_2^{2-}, B_2

D. O_2^{+}, NO^{+}

Answer: C

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34. Bond order of 1.5 is shown by:

A. O_2^{2-}

B. O_2

C. O_2^{+}

D. O_2^-

Answer: D

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35. Which of the following is not a mineral of iron?

A. Pyrolusite

B. Magnetite

C. Malachite

D. Cassiterite

Answer: B

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36. Which one of the alkali metals forms only the normal oxide, M_2O, on heating in air ?

A. Li

B. Na

C. Rb

D. K

Answer: A

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37. The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C), and formic acid (D) is

A. $A > B > C > D$

B. $A > C > B > D$

C. $B > A > D > C$

D. $B > D > C > A$

Answer: C

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38. In the following reaction

$$H_3C - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{C}}} | CH_3 - CH = CH_2 \xrightarrow{H_2O/H^{\oplus}} \underset{\text{product}}{\overset{\text{Major}}{A}} \underset{\text{product}}{\overset{\text{Minor}}{B}}$$

The major product is

A. $H_3C - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{C}}} | CH_3 - CH | \quad OH \quad - CH_3$

B. $H_3C - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{C}}} | CH_3 - CH_2 - CH_2 | \quad OH$

C. $H_3C - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{C}}} | OH - CH | \quad CH_3 \quad - CH_3$

D. $CH_2 | OH - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{C}}} | CH_3 - CH_2 - CH_3$

Answer: C

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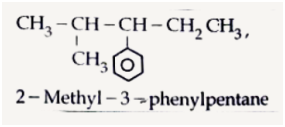
39. Which nomenclature is not according to IUPAC system ?

A. 

B. $CH_3 - C(=O) - CH_2 - CH_2 - CH_2COOH$

5-oxohexanoic acid

C. $Br - CH_2 - CH = CH_2$

1-Bromo-prop-2-ene

D. $CH_3 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - Br - CH_2 - CHCH_3 - CH_3$,

4-Bromo, 2,4-di-methylhexane

Answer: C

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40. Among the following compounds the one that is most reactive towards electrophilic nitration is

A. Toluene

B. Benzene

C. Benzoic acid

D. Nitrobenzene

Answer: A

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41. Deficiency of vitamin B_1 causes the disease

A. Cheilosis

B. Sterility

C. Convulsions

D. Beri-Beri

Answer: D

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42. Which one of the following sets of monosaccharides forms sucrose ?

A. β - D-Glucopyranose and α - D-fructofuranose

B. α - D- Glucopyranose and β - D-fructofuranose

C. α - D-Glucopyranose and α - D-fructofuranose

D. α - D-Glucopyranose and β - D-fructofuranose

Answer: D

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43. Which one of the following statements regarding photochemical smog is not correct?

A. Photochemical smog is formed through photochemical reaction involving solar energy

B. Photochemical smog does not cause irritation in eyes and throat

C. Carbon monoxide does not play any role in photochemical smog formation

D. Photochemical smog is an oxidising agent in character

Answer: B

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44. In the following sequence of reaction

$$CH_3\text{-}Br \xrightarrow{KCN} A \xrightarrow{H_3O^+} B \xrightarrow[Ether]{LiAlH_4} C$$

the end product is .

A. Acetaldehyde

B. Ethyl alcohol

C. Acetone

D. Methane

Answer: B

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45. Which one fo the following is not a condensation polymer ?

A. Dacron

B. Neoprene

C. Melamine

D. Glyptal

Answer: B

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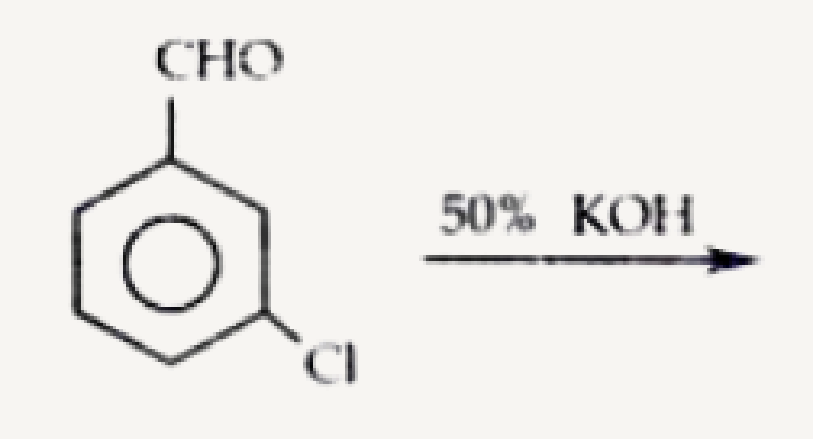
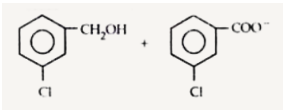
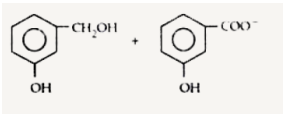
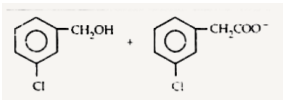
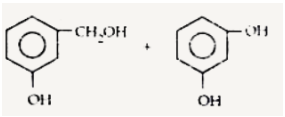
46. Predict the products in the given reaction



A. 

B. 

C. 

D. 

Answer: A

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47. Which of the following acids does not exhibit optical isomerism?

A. Lacetic acid

B. Tartaric acid

C. Maleic acid

D. α-amino acids

Answer: C

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48. CH_3CHO and $C_6H_5CH_2CHO$ can be distinguished chemically by

A. Tollen's reagent test

B. Fehling solution test

C. Benedict test

D. Iodoform test

Answer: D

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49. Which of the following statements is false ?

A. The repeat unit in natural rubber is isoprene

B. Both starch and cellulose are polymers of glucose

C. Artificial silk is derived from cellulose

D. Nylon-66 is an example of elastomer

Answer: D

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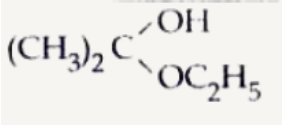
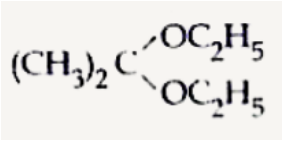
50. Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is

A. 

B. 

C. $CH_3CH_2CH_2 - \overset{O}{\overset{||}{C}} - CH_3$

D. $CH_3 + CH_2CH_2 - \overset{O}{\overset{||}{C}} - CH_2CH_2CH_3$

Answer: B

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51. The value of Planck's constant is $6.63 \times 10^{-34} Js$. The speed of light is $3 \times 10^{17} nms^{-1}$. Which value is the closed to the wavelength in nanometers of a quantum of light with frequency $6 \times 10^{10} s^{-1}$?

A. 10

B. 25

C. 50

D. 75

Answer: C

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52. What is the maximum number of electrons that can be associated with a following set of quantum numbers ? ($n = 3, l = 1$ and $m = -1$).

A. 10

B. 6

C. 4

D. 2

Answer: D

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53. What is the activation energy for a reaction if its rate doubles when the temperature is raised from $20^{\circ}C$ to $35^{\circ}C$? $\left(R = 8.314 J \text{mol K}^{-}\right)$

A. $342\ \text{kJ mol}^{-1}$

B. $269\ \text{kJ mol}^{-1}$

C. $34.7\ \text{kJ mol}^{-1}$

D. $15.1\ \text{kJ mol}^{-1}$

Answer: C

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54. A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl or $pH = 10$ and by passing bydrogen gas around the platinum wire at one atm pressure . The oxidation potential of electrode would be ?

A. 0.059 V

B. 0.59 V

C. 0.118 V

D. 1.18 V

Answer: B

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55. A reaction having equal energies of activation for forward and reverse reactions has

A. $\Delta S = 0$

B. $\Delta G = 0$

C. $\Delta H = 0$

D. $\Delta H = \Delta G = \Delta S = 0$

Answer: C

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56. At $25^{\circ}C$ molar conductance of 0.1 molar aqueous solution of ammonium hydroxide is $9.54 ohm^{-1} cm^2 mol^{-1}$ and at infinte dilution its molar conductance is $238 ohm^{-1} cm^2 mol^{-1}$ The degree of ionisation of ammonium hydroxide at the same concentration and termperature is

A. $2.080\ \%$

B. $20.800\ \%$

C. $4.008\ \%$

D. $40.800\ \%$

Answer: C

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57. Based on equation $E = -2.178 \times 10^{-18} J \left(\frac{Z^2}{n^2}\right)$, certain conclusions are written. Which of them is not correct ?

A. The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus.

B. Larger the value of n, the larger is the orbit radius.

C. Equation can be used to calculate the change in energy when the electron changes orbit.

D. For n = 1, the electron has a more negative energy that it does for n = 6 which means that the electron is more loosely bound in the smallest allowed orbit.

Answer: D

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58. A button cell used in watched funcations as follwing

$$Zn(s) + Ag_2O(s) + H_2O(l) \Leftrightarrow 2Ag(s) + Zn^{2+}(aq.) + 2OH^{-}(aq)$$

If half cell potentials are

$Zn^{2+}(aq.) + 2e^- \rightarrow Zn(s), E^\circ = -0.76V$

$Ag_2O(s) + H_2O(l) + 2e^- \rightarrow 2Ag(s) + 2OH^-(aq.), , E^\circ = 0.34V$

The cell potential will be

A. 1.10 V

B. 0.42 V

C. 0.84 V

D. 1.34 V

Answer: A

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59. How many grams of concentrated nitric acid solution should be used to prepare $250mL$ of $2.0MHNO_3$? The concentrated acid is $70\ \% HNO_3$:

A. 45.0 g conc. HNO_3

B. 90.0 g conc. HNO_3

C. 70.0 conc. HNO_3

D. 54.0 g conc. HNO_3

Answer: A

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60. The number of carbon atoms per unit cell of diamond unit cell is

A. 4

B. 8

C. 6

D. 1

Answer: B

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61. Maximum deviation from ideal gas is expected from

A. $H_2(g)$

B. $N_2(g)$

C. $CH_4(g)$

D. $NH_3(g)$

Answer: D

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62. A metal has a fcc lattice.The edge length of the unit cell is 404 pm ,the density of the metal is $2.72 gcm^{-3}$. The molar mass of the metal is $\left(N_A,\right.$ Avorgadro's constant $\left. = 6.02 \times 10^{23} mol^{-1}\right)$

A. $40\ \text{g mol}^{-1}$

B. $30\ \text{g mol}^{-1}$

C. $27\ \text{g mol}^{-1}$

D. $20\ \text{g mol}^{-1}$

Answer: C

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63. Dipole-induced dipole interaction are present in which of the following pairs

A. H_2O and alcohol

B. Cl_2 and CCl_4

C. HCl and He atoms

D. SiF_4 and He atoms

Answer: C

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64. A magnetic moment of 1.73 B.M. will be shown by one among the following:

A. $\left[Cu\left(NH_3\right)_4\right]^{2+}$

B. $\left[Ni(CN)_4\right]^{2-}$

C. $TiCl_4$

D. $\left[CoCl_6\right]^{4-}$

Answer: A

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65. Roasting of sulphides gives the gas X as a by product. This is a colourless gas with choking smell of burnt sulphur and causes great damage to repiratory organs as a result of acid rain. Its aqueous solution is acidic, acts as reducing agent and its acid has never been isolated. The gas X is :-

A. H_2S

B. SO_2

C. CO_2

D. SO_3

Answer: B

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66. Which is the strongest acid in the following ?

A. H_2SO_4

B. $HClO_3$

C. $HClO_4$

D. H_2SO_3

Answer: C

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67. Which of the following is paramagnetic ?

A. CO

B. CO_2^-

C. CN^-

D. NO^+

Answer: B

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68. Which of the following structure is similar to graphite e?

A. BN

B. B

C. B_4C

D. B_2H_6

Answer: A

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69. The basic structural unit of silicates is

A. SiO^{-}

B. SiO_4^{4-}

C. SiO_3^{2-}

D. SiO_4^{2-}

Answer: B

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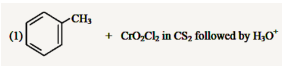
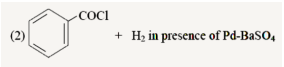
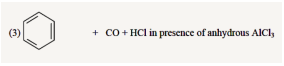
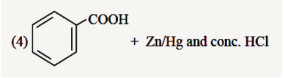
70. Reaction by which benzaldehyde cannot be prepared is :

A. 

B. 

C. 

D. 

Answer: D

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71. Which of the following does not give oxygen on heating?

A. $KClO_3$

B. $Zn\left(ClO_3\right)_2$

C. $K_2Cr_2O_7$

D. $\left(NH_4\right)_2Cr_2O_7$

Answer: D

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72. Which of the following lanthanoid ions is diamagnetic? (Atomic number of $Ce = 58, Sm = 62, Eu = 63, Yb = 70$]

A. Ce^{2+}

B. Sm^{2+}

C. Eu^{2+}

D. Yb^{2+}

Answer: D

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73. Indentify the correct order of solubility in aqueous medium

A. $CuS > ZnS > Na_2S$

B. $ZnS > Na_2S > CuS$

C. $Na_2S > CuS > ZnS$

D. $Na_2S > ZnS > CuS$

Answer: D

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74. XeF_2 is isostructural with

A. TeF_2

B. ICl_2^-

C. $SbCl_3$

D. $BaCl_2$

Answer: B

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75. An excess of $AgNO_3$ is added to $100mL$ of a $0.01M$ solution of dichlorotetraaquachromium(III) chloride The number of moles of $AgCI$ precipitated would be .

A. 0.001

B. 0.002

C. 0.003

D. 0.01

Answer: A

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76. Which of these is least likely to act as Lewis base?

A. CO

B. F^-

C. BF_3

D. PF_3

Answer: C

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77. $KMnO_4$ can be prepared fromK_2MnO_4 as per the reaction: 

The reaction can go the completion by removing $OH^{\ominus}$ ions by adding.

A. HCl

B. KOH

C. CO_2

D. SO_2

Answer: C

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78. Which of the following is electron deficient ?

A. $\left(CH_3\right)_2$

B. $\left(SiH_3\right)_2$

C. $\left(BH_3\right)_2$

D. PH_3

Answer: C

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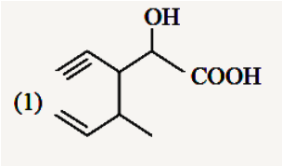
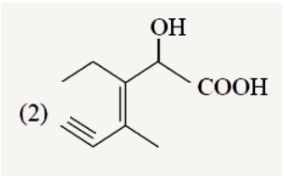
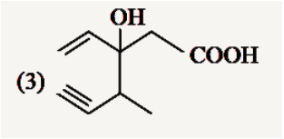
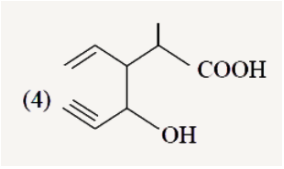
79. Structure of the compound whose *IUPAC* name is 3 - ethyl-2 - hydroxy-4 - methylhex-3 - en-5 - ynoic acid is

A. 

B. 

C. 

D. 

Answer: B

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80. Which of these is not a monomer for a high-molecular mass silicone polymer?

A. $MeSiCl_3$

B. Me_2SiCl_2

C. Me_3SiCl

D. $PhSiCl_3$

Answer: C

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81. Which of the following statements about the interstitial compounds is incorrect?

A. They retain metallic conductivity

B. They are chemically reactive

C. They are much harder than the pure metal

D. They have higher melting points than the pure metal

Answer: B

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82. Which one of the following molecules contains no π - bond ?

A. CO_2

B. H_2O

C. SO_2

D. NO_2

Answer: B

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83. Antiseptics and disinfectants either kill or prevent growth of microorganism. Identify which of the following statements is not true :

A. A0.2 % solution of phenol is an antiseptic while 1 % solution acts as a disinfectant

B. Chlorine and Iodine are used as strong disinfectants

C. Dilute solutions of boric acid and hydrogen peroxide are strong antiseptics

D. Disinfectants harm the living tissues

Answer: C

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84. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?

A. $CH_3 - CH_2 - CH_2 - CH_2 - O_C H_3$

B. $CH_3 - CH_2 - C \mid CH_3 H - O - CH_3$

C. $CH_3 - \overset{CH_3}{\underset{|}{C}} \mid CH_3 - O - CH_3$

D. $CH_3 - CH \mid CH_3 - CH_2 - O - CH_3$

Answer: C

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85. Nylon is an example of

A. Polyester

B. Polysaccharide

C. Polyamide

D. Polythene

Answer: C

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86. The structure of isobutyl group in an organic compound is

A. $(1)\ \begin{matrix}CH_3\\CH_3\end{matrix}>CH-CH_2-$

B. CH_3 - C | H - CH_2 - CH_3

C. CH_3 - CH_2 - CH_2 - CH_2 -

D. CH_3 - $\begin{matrix}CH_3\\|\\C\end{matrix}$ | CH_3 -

Answer: A

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87. Nitrobenzene on reaction with conc HNO_3/H_2SO_4 at 80 - $100\,^\circ C$ forms which one of the following products .

A. 1,2-Dinitrobenzene

B. 1,3-Dinitrobenzene

C. 1,4-Dinitrobenzene

D. 1,2,4-Trinitrobenzene

Answer: B

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88. Some meta-directing substituents in aromatic substitution are given which one is the most deactivating?

A. $-C \equiv N$

B. $-SO_3H$

C. $-COOH$

D. NO_2

Answer: D

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89. 6.02×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of solution is :

A. 0.02 M

B. 0.01 M

C. 0.001 M

D. 0.1 M

Answer: B

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90. Which of the following is a polar molecule

A. BF_3

B. SF_4

C. SiF_4

D. XeF_4

Answer: B

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91. Which is the monomer of neoprene in the following?

A. $CH_2 = CH - CH = CH_2$

B. $CH_2 - C(CH_3) - CH = CH_2$

C. $CH_2 = C(Cl) - CH = CH_2$

D. $CH_2 = CH - C \equiv CH$

Answer: C

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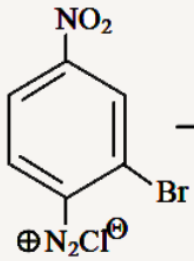
92. In the reaction  ; A is-

A. $HgSO_4/H_2SO_4$

B. Cu_2Cl_2

C. H_3PO_2 and H_2O

D. H^+/H_2O

Answer: C

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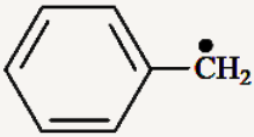
93. The radical,  is aromatic because it has-

A. 6 p-orbitals and 6 unpaired electrons

B. 7 p-orbitals and 6 unpaired electrons

C. 7 p-orbitals and 7 unpaired electrons

D. 6 p-orbitals and 7 unpaired electrons

Answer: A

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94. The order of stability of the following tautomeric compounds is

(i). $CH_2 = \overset{OH}{\overset{|}{CH}} - CH_2 - \overset{O}{\overset{||}{C}} - CH_3 \Leftrightarrow$

(ii). $CH_3 - \overset{O}{\overset{||}{C}} - CH_2 - \overset{O}{\overset{||}{C}} - CH_3 \Leftrightarrow$

(iii). $CH_3 - \overset{OH}{\overset{|}{C}} = CH - \overset{O}{\overset{||}{C}} - CH_3$

A. $I > II > III$

B. $III > II > I$

C. $II > I > III$

D. $II > III > I$

Answer: B

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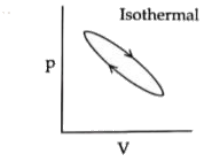
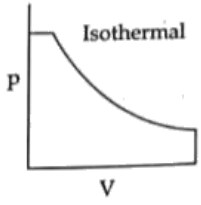
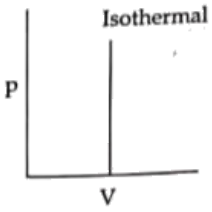
Section - A (Chemistry)

1. Which of the following p-V curve represents maximum work done?

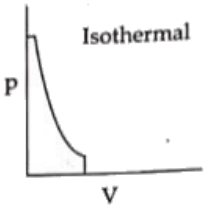
A. 

B. 

C.



D.



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2. Given below are two statements :

Statement I:

Primary aliphatic amines react with HNO_2 to give unstable diazonium salts.

Statement II:

Primary aromatic amines react with HNO_2 to form diazonium salts which are stable even above 300 K.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both Statement I and Statement II are correct.

B. Both Statement I and Statement II are incorrect.

C. Statement I is correct but Statement II is incorrect.

D. Statement I is incorrect but Statement II is correct

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3. Which amongst the following is incorrect statement?

A. The bond orders of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1 respectively.

B. C_2 molecule has four electrons in its two degenerate π molecular orbitals.

C. H_2^+ ion has one electron

D. O_2^+ ion is diamagnetic.

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4. $RMgX + CO_2 \xrightarrow[\text{ether}]{\text{dry}} Y \xrightarrow{H_2O^+} RCOOH$

What is Y in the above reaction?

A. $RCOO^-Mg^+X$

B. $R_3CO^-Mg^+X$

C. $RCOO^-X^+$

D. $(RCOO)_2Mg$

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5. Which statement regarding polymers is not correct?

A. Elastomers have polymer chains held together by weak intermolecular forces.

B. Fibers possess high tensile strength.

C. Thermoplastic polymers are capable of repeatedly softening and hardening on heating and cooling respectively.

D. Thermosetting polymers are reusable.

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6. Given below are half cell reactions :

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

$E^\circ_{Mn^{2+}/MnO_4^-} = -1.510V$

$\frac{1}{2}O_2 + 2H^+ + 2e^- \rightarrow H_2O$

$E^\circ_{O_2/H_2O} = +1.223V$

Will the permanganate ion, MnO_4^- liberate O_2 from water in the presence of an acid ?

A. Yes, because $E^{\circ}_{cell} = +0.287V$

B. No, because $E^{\circ}_{cell} = -0.287V$

C. Yes, because $E^{\circ}_{cell} = +2.733V$

D. No, because $E^{\circ}_{cell} = -2.733V$

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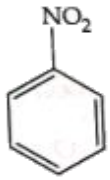
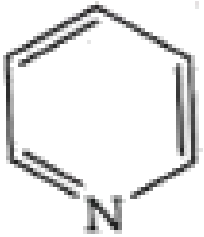
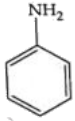
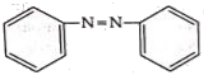
7. Kjeldahi's method cannot be used to estimate nitrogen for which of the following compounds ?

A. 

B. 

C. 

D. 

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8. The incorrect statement regarding enzymes is:

A. Enzymes are biocatalysts.

B. Like chemical catalysts enzymes reduce the activation energy of bio processes

C. Enzymes are polysaccharides.

D. Enzymes are very specific for a particulai reaction and substrate.

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9. The IUPAC name of the complex - $\left[Ag\left(H_2O\right)_2\right]\left[Ag(CN)_2\right]$ is:

A. dicyanidosilver(II) diaquaargentate(II)

B. diaquasilver(II) dicyanidoargentate(II)

C. dicyanidosilver(I) diaquaargentate(1)

D. diaquasilver(I) dicyanidoargentate(I)

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10. Match List - I with List - II.

	List - I (Drug class)		List - II (Drug molecule)
(a)	Antacids	(i)	Salvarsan
(b)	Antihistamines	(ii)	Morphine
(c)	Analgesics	(iii)	Cimetidine
(d)	Antimicrobials	(iv)	Seldane

Choose the correct answer from the options given below:

A. (a) - (iii), (b) - (ii), (c)-(iv), (d) -(i)

B. (a) - (iii), (b)-(iv), (c)-(ii), (d)- (i)

C. (a)-(i), (b) - (iv), (c)- (i), (d) - (iii)

D. (a)-(iv), (b)- (iii), (c)-(i), (d) - (ii)

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11. Amongst the following which one will have maximum'lone pair - lone pair' electron repulsions ?

A. CIF_3

B. IF_5

C. SF_4

D. XeF_2

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12. At 298 K, the standard electrode potentials of $Cu^{2+}/Cu, Zn^{2+}/Zn, Fe^{2+}/Fe$ and Ag^{+}/Ag are 0.34 V, -0.76 V, -0.44 V and 0.80 V, respectively.

On the basis of standard electrode potential, predict which of the following reaction can not occur?

A. $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$

B. $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

C. $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$

D. $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4(aq)$

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13. Identify the incorrect statement from the following:

A. All the five 5d orbitals are different in size when compared to the respective 4d orbitab.

B. All the five 4d orbitals have shapes similar to the respective 3d orbitals.

C. In an atom, all the five 3d orbitals are equal in energy in free state.

D. The shapes of d_{xy}, d_{yz} and d_{zx} orbitals are similar to each other, and $d_{x^2-y^2}$ and d_z2 similar to each other.

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14. In one molal solution that contains 0.5 m solute, there is

A. 500 mL of solvent

B. 500 g of solvent

C. 100 mL of solvent

D. 1000 g of solvent

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15. Given below are two statements : one is labelled as

Assertion (A) and the other is labelled as Reason (R).

Assertion (A): ICI is more reactive than I_2

Reason (R): I - Cl bond is weaker than I-I bond.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. (A) is correct but(R) is not correct.

D. (A) is not correct but (R) is correct.

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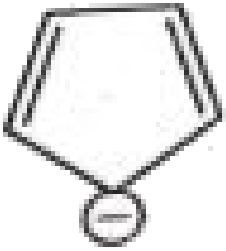
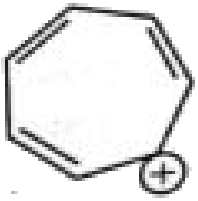
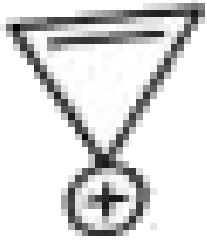
16. Which compound amongst the following is not an aromatic compound ?

A. 

B. 

C. 

D. 

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17. Given below are two statements :

Statement I:

The boiling points of the following hydrides of group 16 elements increases in the order $H_2O < H_2S < H_2Se <$ H_2 Te.

Statement II:

The boiling points of these hydrides increase with increase in molar mass.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both Statement I and Statement II are correct

B. Both Statement I and Statement II are incorrect

C. Statement I is correct but Statement II is incorrect

D. Statement I is incorrect but Statement II is correct

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18. Match List - I with List - II

List - I			List - II
(a)	Li	(i)	absorbent for carbon dioxide
(b)	Na	(ii)	electrochemical cells
(c)	KOH	(iii)	coolant in fast breeder reactors
(d)	Cs	(iv)	photoelectric cell

Choose the correct answer from the options given below :

A. (a)-(iv), (b) - (i), (c) - (ii), (d) -(ii)

B. (a)- (iii), (b) - (iv), (c) - (i), (d) - (i)

C. (a) - (i), (b) - (iii), (C) - (iv), (d)- (ii)

D. (a)-(ii), (b) - (ii), (C)-(i), (d)- (iv)

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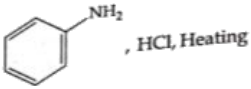
19. Which of the following sequence of reactions is suitable to synthesize chlorobenzene?

A. Benzene, Cl_2, anhydrous $FeCl_3$

B. Phenol, $NaNO_2$, HCl, CuCl

C. 

D. 

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20. Given below are two statements:

Statement I:

The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole - dipole interactions.

Statement II:

The boiling points of aldehydes and ketones are lower than the alcohols

of similar molecular masses due to the absence of H-bonding.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both Statement I and Statement II are correct.

B. Both Statement I and Statement II are incorrect

C. Statement I is correct but Statement II is incorrect.

D. Statement I is incorrect but Statement II is correct.

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21. Match List - I with List - II.

List - I (Products formed)		List - II (Reaction of carbonyl compound with)	
(a)	Cyanohydrin	(i)	NH_2OH
(b)	Acetal	(ii)	RNH_2
(c)	Schiff's base	(iii)	alcohol
(d)	Oxime	(iv)	HCN

Choose the correct answer from the options given below:

A. (a)- (iii), (b) - (iv), (c)-(i), (d) - (i)

B. (a)-(i), (b)-(iii), (c)-(iv), (d)-(i)

C. (a)-(i), (b) - (iii), (c) - (i), (d) - (iv)

D. (a)-(iv), (b)- (iii), (c)-(ü), (d) - (i)

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22. The incorrect statement regarding biogas is

A. S_N1 reaction yields 1:1 mixture of both enantiomers.

B. The product obtained by S_N2 reaction of haloalkane having chirality at the reactive site shows inversion of configuration.

C. Enantiomers are superimposable mirror images on each other.

D. A racemic mixture shows zero optical rotation.

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23. Match List - I with List - II.

	List - I (Hydrides)		List - II (Nature)
(a)	MgH_2	(i)	Electron precise
(b)	GeH_4	(ii)	Electron deficient
(c)	B_2H_6	(iii)	Electron rich
(d)	HF	(iv)	Ionic

Choose the correct answer from the options given below:

A. (a)-(iv), (b)-(i), (c) - (i), (d)-(ii)

B. (a) - (iii), (b)- (i), (c)-(i), (d) - (iv)

C. (a)- (i), (b) - (ii), (c)- (iv), (d) - (iii)

D. (a)- (i), (b) - (ii), (c)-(iv), (d) - (i)

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24. Which of the following statement is not correct about diborane?.

A. There are two 3-centre-2-electron bonds.

B. The four terminal B-H bonds are two centre two electron bonds.

C. The four terminal Hydrogen atoms and the two Boron atoms lie in one plane.

D. Both the Boron atoms are sp^2 hybridised.

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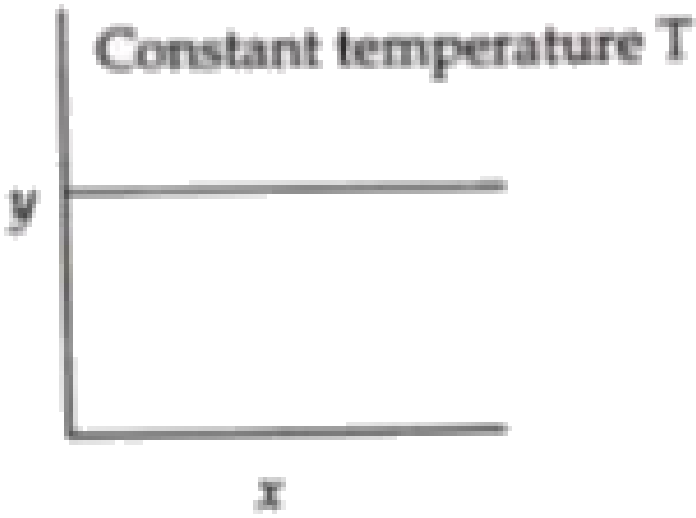
25. The given graph is a representation of kinetics of a reaction.



They and x axes for zero and first order reactions respectively are

A. zero order (y=concentration and x=time) first order ($y = t_{1/2}$ and x=concentration)

B. zero order (y = concentration and x=time). first order (y=rate constant anã x=concentration)

C. zero order (y=rate and x=concentration), first order ($y = t_{1/2}$ andx=concenration)

D. zero order (y=rate and x=concentration), first order (y=rate and $x = t_{1/2}$)

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Section - B (Chemistry)

1. Match List - I with List - II. List - I .

	List - I (Ores)		List - II (Composition)
(a)	Haematite	(i)	Fe_3O_4
(b)	Magnetite	(ii)	$ZnCO_3$
(c)	Calamine	(iii)	Fe_2O_3
(d)	Kaolinite	(iv)	$[Al_2(OH)_4Si_2O_5]$

Choose the correct answer from the options given below:

A. (a)- (i), (b)-(ii), (c) - (ii), (d) - (iv)

B. (a)-(iii), (b)-(i), (c)-(ii), (d) - (iv).

C. (a) - (ii), (b)-(i), (c)-(iv), (d)-(ii)

D. (a)-(i), (b)- (iii), (c) - (ii), (d) - (iv)

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2. A 10.0 L flask contains 64 g of oxygen at $27^{\circ}C$ (Assume O_2 gas is behaving ideally). The pressure inside the flask in bar' is

(Given $R = 0.0831 L\bar{K}^{-1}mol^{-1}$) 2.5

A. 2.5

B. 498, 6

C. 49.8

D. 4.9

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3. For a first order reaction $A \rightarrow$ Products, concentration of A is 0.1 M, which becomes . after 5 minutes. Rate constant for the reaction in $\min^{-1}$ is

A. 1.3818

B. 0.9212

C. 0.4606

D. 0.2303

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4. The the order of energy absorbed which is responsible for the color of complexes

(A) $\left[Ni\left(H_2O\right)_2(en)_2\right]^{2+}$

(B) $\left[Ni\left(H_2O\right)4(en)\right]^{2+}$ and

(C) $\left[Ni(en)_3\right]^{2+}$ si

A. $(A) > (B) > (C)$

B. $(C) > (B) > (A)$

C. $(C) > (A) > (B)$

D. $(B) > (A) > (C)$

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5. $3O_2(g) \Leftrightarrow 2O_3(g)$

for the above reaction at 298 K, K, is found to be 3.0×10^{-59} . If the concentration of O_2 at equilibrium is 0.040 M then concentration of O_3 in M is

A. 4.38×10^{-32}

B. 1.9×10^{-63}

C. 2.4×10^{31}

D. 1.2×10^{21}

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6. Find the emf of the cell in which the following reaction takes place at 298 K

Ni(s) $+2Ag^{+}(0.001M) \rightarrow Ni^{2+}$ (0.001M) + 2Ag(s)

(Given that E°_{cell} = 10.5 V, $\frac{2.303RT}{F}$ = 0.059 at 298 K)

A. 1.0385 V

B. 1.385 V

C. $0.9615V$

D. 1.05 V

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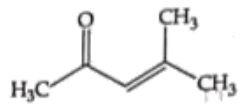
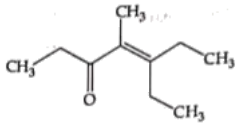
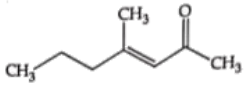
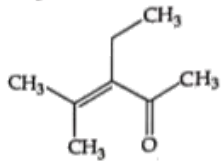
7. Phenol reacts with benzoyl chloride in the presence of dilute $NaOH$ to form

A. 

B. 

C. 

D. 

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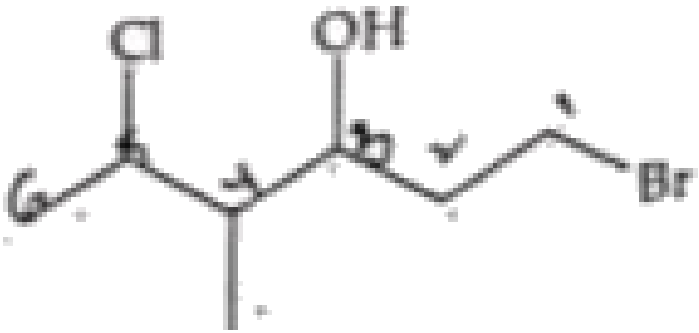
8. The correct IUPAC name of the following compound



A. 1-bromo-5-chloro-4-methylhexan-3-ol

B. 6-bromo-2-chloro-4-methylhexan 4-ol

C. 1-bromo-4-methyl-5-chlorohexan-3-ol

D. 6-bromo-4-methyl-2-chlorohexan-4- 0l

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9. If radius of second radius of second Bohr orbit of the He^+ ion is 105.8 pm, what is the radius of third Bohr orbit of Li^{2+} ion?

A. 158.7 pm

B. 15.87 pm

C. 1.587 pm

D. 158.7 Å

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10. Compound X on reaction with O_2 followed by Zn/ H2O gives formaldehyde and 2 methylpropanal as products. The compound X is :

A. 3-Methylbut-1-ene

B. 2-Methylbut-1-ene

C. 2-Methylbut-2-ene

D. Pent-2-ene

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11. In the neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from

A. $+7$to $+4$

B. $+6$to $+4$

C. $+7$to $+3$

D. $+7$ to $+5$

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12. The pollution due to oxides of sulphur gets enhanced due to the presence of:

(a) particulate matter

(b) ozone

(c) hydrocarbons

(d) hydrogen peroxide

Choose the most appropriate answer from the options given below:

A. (a), (d) only

B. (a), (b), (d) only

C. (b), (c), (d) only

D. (a), (c), (d) only

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13. Given below are two statements :

Statement I:

In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. HCI+ $ZnCl_2$, known as Lucas Reagent

Statement II:

Primary alcohols are most reactive and immediately produce turbidity at

room temperature on reaction with Lucas Reagent.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both Statement I and Statement II are correct.

B. Both Statement I and Statement II are incorrect.

C. Statement I is correct but Statement II is incorrect.

D. Statement I is incorrect but Statement II is correct.

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14. Copper crystallises in fcc unit cell with cell edge length of 3.608×10^{-8} cm. The density of copper is 8.92 g cm^{-3}. Calculate the atomic mass of copper.

A. 63.1 u

B. 31.55 u

C. 60 u .

D. 65 u

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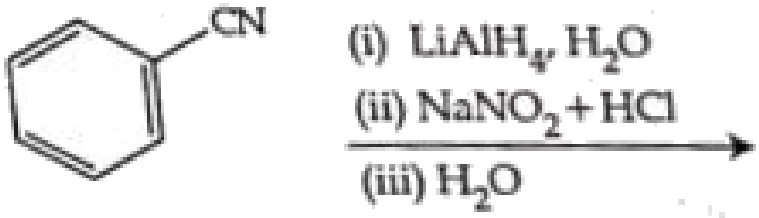
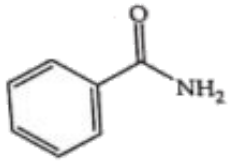
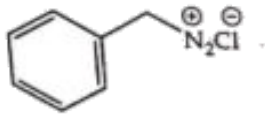
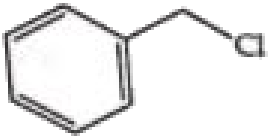
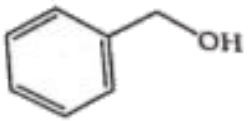
15. The product formed from the following reaction sequence is



A. 

B. 

C. 

D. 

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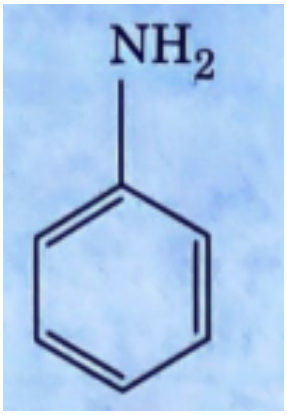
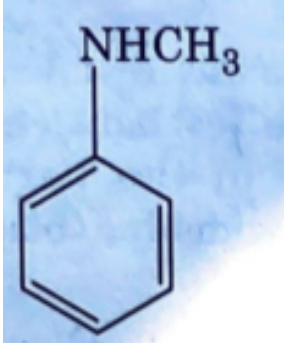
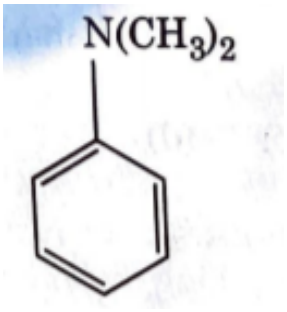
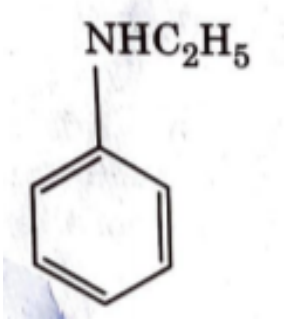
Others

1. Which of the following amine will give the carbylamine test ?

A. 

B. 

C. 

D. 

Answer: A

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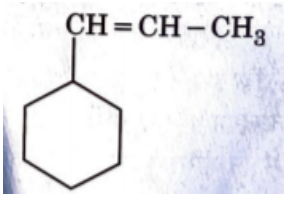
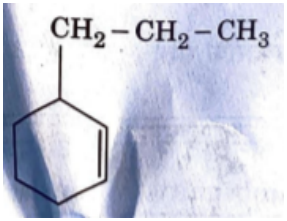
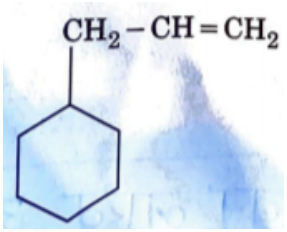
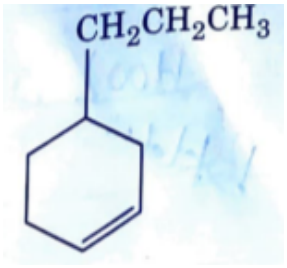
2. An alkene on ozonolysis gives methanal as one of the product. Its structure is :

A. 

B. 

C. 

D. 

Answer: C

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3. Match the following and identify the correct option.

(a)	$CO(g) + H_2(g)$	(i)	$Mg(HCO_3)_2 + Ca(HCO_3)_2$
(b)	Temporary hardness of water	(ii)	An electron deficient hydride
(c)	B_2H_6	(iii)	Synthesis gas
(d)	H_2O_2	(iv)	Non-planar structure

A. a-iii, b-i, c-ii, d-iv

B. a-iii, b-ii, c-i, d-iv

C. a-iii, b-iv, c-ii, d-i

D. a-i, b-iii, c-ii, d-iv

Answer: A

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4. The freezing point depression constant of benzene is 5.12 K kg mol^{-1}. The freezing point depression for the solution of molality 0.078m containing a non-electrolyte solute in benzene is

A. 0.20K

B. 0.80K

C. 0.40K

D. 0.60K

Answer: C

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5. During the electrolysis of a dilute solution of sulphuric acid, what substance is produced at the anode?

A. Hydrogen gas

B. Oxygen gas

C. H_2S gas

D. SO_2 gas

Answer: B

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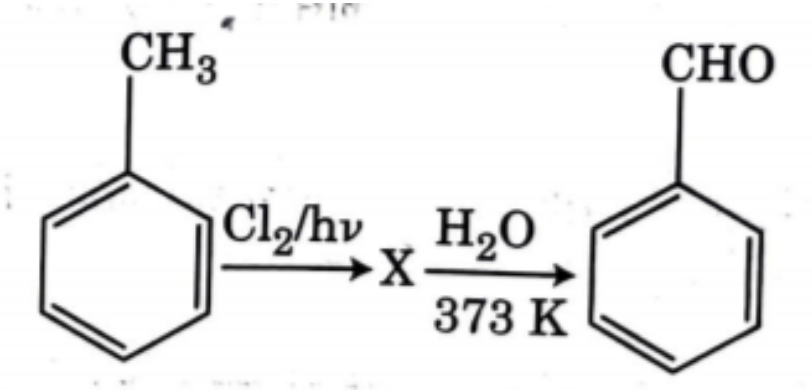
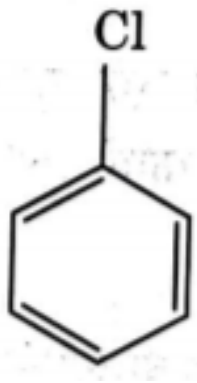
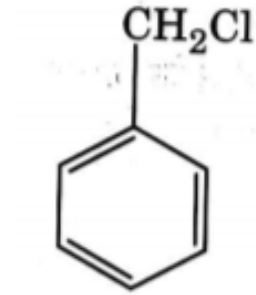
6. Identify compound X in the following sequence reactions:



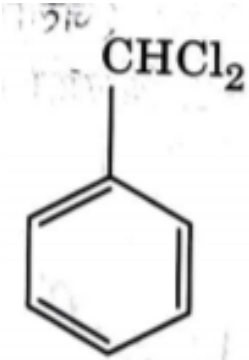
A.



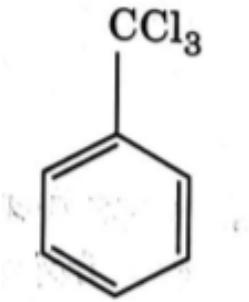
B.



C.



D.



Answer: C

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7. Which one of the following has maximum number of atoms?

A. 1g of Ag(s) [Atomic mass of Ag =108]

B. 1g of Mg(s) [Atomic mass of Mg =24]

C. 1g of O_2(s) [Atomic mass of O =16]

D. 1g of Li(s) [Atomic mass of Li =7]

Answer: D

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8. Identify the correct statement from the following:

A. Wrought iron is impure iron with 4% carbon

B. Blister copper has blistered appearance due to evolution of CO_2

C. Vapour phase refining is carried out for Nickel by Van Arkel method

D. Pig iron can be moulded into a variety of shapes.

Answer: D

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9. A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of which of the following ?

A. -I effect of- CH_3 groups

B. +R effect of- CH_3 groups

C. -R effect of- CH_3 groups

D. Hyperconjugation

Answer: D

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10. Urea reacts with water to form A which will decompose to form B. B when passed through Cu^{2+}(aq), deep blue color solution C is formed. What is the formula of C from the following?

A. $CuSO_4$

B. $\left[Cu\left(NH_3\right)_4\right]^{2+}$

C. $Cu(OH)_2$

D. $CuCO_3Cu(OH)_2$

Answer: B

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11. A mixture of N_2 and Ar gases in a cylinder contains 7g of N_2 & 8 g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27bar, the partial pressure of N_2 is:

A. 9bar

B. 12bar

C. 15bar

D. 18bar

Answer: C

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12. An element has a body centered cubic (bcc) structure with a cell edge of 288pm. The atomic radius is:

A. $\frac{\sqrt{3}}{4} \times 288 \pm$

B. $\frac{\sqrt{2}}{4} \times 288 \pm$

C. $\frac{4}{\sqrt{3}} \times 288 \pm$

D. $\frac{4}{\sqrt{2}} \times 288 \pm$

Answer: A

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13. The rate constant for a first order reaction is $4.606 \times 10^{-3} s^{-1}$. The time required to reduce 2.0g of the reactant to 0.2g is:

A. 100s

B. 200 s

C. 500 s

D. 1000 s

Answer: C

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14. Reaction between acetone and methyl magnesium chloride followed by hydrolysis will give:

A. Isopropyl alcohol

B. sec. butyl alcohol

C. Tert. butyl alcohol

D. Isobutyl alcohol

Answer: C

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15. Which of the following set of molecules will have zero diplole moment?

A. Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene

B. Boron trifluoride, hydrogen fluoride, carbon dioxide, 1,3-dichlorobenzene

C. Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene

D. Boron trifluoride, beryllium difluoride, carbon dioxide, 1,4-dichlorobenzene

Answer: D

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16. What is the change in oxidation number of carbon in the following reaction?

$$CH_4(g) + 4Cl_2(g) \rightarrow \mathbb{C}l_4(l) + 4HCl(g)$$

A. 4 to 4

B. 0 to 4

C. -4 to +4

D. 0 to -4

Answer: C

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17. Match the following :

	Oxide		Nature
(a)	CO	(i)	Basic
(b)	BaO	(ii)	Neutral
(c)	Al_2O_3	(iii)	Acidic
(d)	Cl_2O_7	(iv)	Amphoteric

Which of the following is correct option ?

A. a-i, b-ii, c-iii, d-iv

B. a-ii, b-i, c-iv, d-iii

C. a-iii, b-iv, c-i, d-ii

D. a-iv, b-iii, c-ii. d-i

Answer: B

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18. Which of the following is not correct about carbon monoxide?

A. It forms carboxyhaemoglobin

B. It reduces oxygen carrying ability of blood

C. The carboxyhaemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin

D. It is produced due to incomplete combustion

Answer: C

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19. Measuring Zeta potential is useful in determining which property of colloidal solution?

A. Viscosity

B. Solubility

C. Stability of the colloidal particles

D. Size of the colloidal particles

Answer: C

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20. Which of the following is the correct order of increasing field strength of ligands to form coordination compounds?

A. $SCN^- < F^- < C_2O_4^{2-} < CN^-$

B. $SCN^- < F^- < CN^- < C_2O_4^{2-}$

C. $F^- < SCN^- < C_2O_4^{2-} < CN^-$

D. $CN^- < C_2O_4^{2-} < SCN^- < F^-$

Answer: A

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21. Elimination reaction of 2-Bromopentane to form pent-2-ene is:

a) β- Ellimination reaction

b) Follows Zaitsev rule

c) Dehydrohalogenation reaction

d) Dehydration reaction

A. a),b),c)

B. a),c),d)

C. b),c),d)

D. a),b),d)

Answer: A

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22. Which of the following is the correct option for the free expansion of an ideal gas under adiabatic condition?

A. $q = 0,\ \triangle T = 0$ and $w = 0$

B. $q = 0,\ \triangle T < 0$ and $w > 0$

C. $q < 0,\ \triangle T = 0$ and $w = 0$

D. $q > 0,\ \triangle T > 0$ and $w > 0$

Answer: D

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23. Identify the incorrect statement.

A. $Cr^{2+}\left(d^4\right)$ is a stronger reducing agent than $Fe^{2+}\left(d^6\right)$ in water

B. The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.

C. Interstitial compounds are those that are formed when small atoms like H,C, orN are trapped inside the crystal lattices of metals.

D. The oxidation states of chromium in CrO_4^{2-} and $Cr_2o_7^{2-}$ are not the same.

Answer: D

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24. Identify the incorrect match.

	Name		IUPAC Official Name
(a)	Unnilunium	(i)	Mendelevium
(b)	Unniltrium	(ii)	Lawrencium
(c)	Unnilhexium	(iii)	Seaborgium
(d)	Ununnnium	(iv)	Darmstadtium

A. a-i

B. b-ii

C. c-iii

D. d-iv

Answer: D

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25. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as:

A. Aldol condensation

B. Cannizzaro's reaction

C. Cross Cannizzaro's reaction

D. Cross Aldol condensation

Answer: D

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26. Which of the following oxoacids of sulpher has -O-O- linkage ?

A. H_2SO_3 Sulphurous acid

B. H_2SO_4 Sulphuric acid

C. $H_2S_2O_8$ peroxodisulphuric acid

D. $H_2S_2O_7$ Pyrosulphuric acid

Answer: C

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27. HCl was passed through a solution of $CaCl_2, MgCl_2$ and $NaCl$ Which of the following compound(s) crystallise(s) ?

A. Both $MgCl_2$ and $CaCl_2$

B. only NaCl

C. only $MgCl_2$

D. NaCl, $MgCl_2$ and $CaCl_2$

Answer: B

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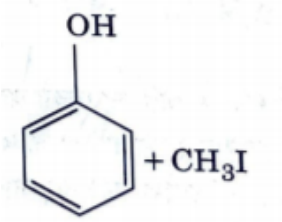
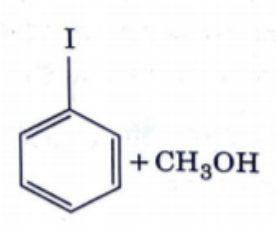
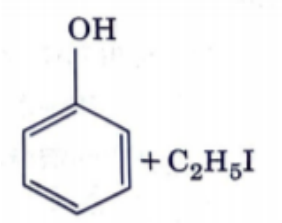
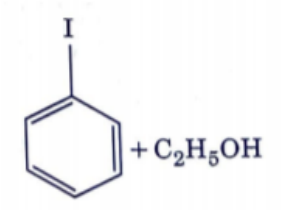
28. Anisole on cleavage with HI gives:

A. 

B. 

C. 

D. 

Answer: A

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29. Identify the correct statements from the following :

a) $CO_2(g)$ is used as refrigerant for ice-cream and frozen food.

b) The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.

c) ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.

d) CO is colorless and odourless gas.

A. a,b and c only

B. a and c only

C. b and c only

D. c and d only

Answer: D

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30. For the reaction, $2Cl(g) \rightarrow Cl_2(g)$, the correct option is:

A. $\triangle_r H > 0$ and $\triangle_r S > 0$

B. $\triangle_r H > 0$ and $\triangle_r S < 0$

C. $\triangle_r H < 0$ and $\triangle_r S > 0$

D. $\triangle_r H < 0$ and $\triangle_r S < 0$

Answer: D

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31. Paper chromatography is an example of:

A. adsorption chromatography

B. partition chromatography

C. Thin layer chromatography

D. Column chromatography

Answer: B

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32. Which of the following alkane cannot be made in good yield by Wurtz reaction?

A. n-Hexane

B. 2,3- Dimethylbutane

C. n-Heptane

D. n-Butane

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33. An increse in the concentration of the reactants of a reaction leads to change in:

A. activation energy

B. heat of reaction

C. threshold energy

D. collision frequency

Answer: D

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34. The number of Faradays(F) required to produce $20g$ of calcuim from molten $CaCl_2$ (Atomic massof $Ca = 40gmol^{-1}$) is:

A. 1

B. 2

C. 3

D. 4

Answer: A

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35. The mixture which shows positive deviation from Raoult's law is:

A. Ethanol+Acetone

B. Benzene+Toluene

C. Acetone+Chloroform

D. Chloroethane+Bromoethane

Answer: A

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36. Hydrolysis of sucrose is given by the following reaction.

$Sucrose + H_2O \rightarrow Glucose$ + Fructose If the equilibrium constant $\left(K_c\right)$ is 2×10^{13} at $300K$ the value of $\delta_r G^{\theta}$ at the same temperature will be:

A. -8.314 J mol(-1) K^(-1) x 300K x ln(2x10^13)

B. 8.314 J mol^(-1) K^-1 x 300K x ln(2x10^13)

C. `8.314 J mol^(-1) K^-1 x 300K x ln(3 x 10^13)

D. `-8.314 J mol^(-1) K^-1 x 300K x ln(4 x 10^13)

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37. Sucrose on hydrolysis gives:

A. β - $DGlucose + \alpha$ - $DFruc \rightarrow se$

B. α - $DGlucose + \beta$ - $DFruc \rightarrow se$

C. α - $DGlucose + \beta$ - $DFruc \rightarrow se$

D. α - $DGlucose + \beta$ - $DFruc \rightarrow se$

Answer: C

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38. The calculated spin only magnetic moment of Cr^{2+} ion is:

A. $3.87BM$

B. $4.90BM$

C. $5.92BM$

D. $2.84BM$

Answer: B

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39. Which of the following is a natural polymer?

A. *cis* - 1, 4 - polyisoprene

B. poly (Butadiene-styrene)

C. polybutadiene

D. poly (Butadiene-acrylonitrile)

Answer: A

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40. Which of the following is a basic amino acid?

A. Serine

B. Alanine

C. Tyrosine

D. Lysine

Answer: D

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41. Which of the following is a cationic detergent?

A. Sodium lauryl sulphate

B. Sodium stearate

C. Cetyltrimethyl ammonium bromide

D. Sodium dodecylbenzene sulphonate

Answer: C

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42. Find out the solubility of $Ni(OH)_2$ in $0.1M$ NaOH Given that the ionic product of $Ni(OH)_2$ is 2×10^{-15}.

A. 2×10^{-13}M

B. 2×10^{-8} M

C. 1×10^{-13}M

D. 1×10^{8} M

Answer: A

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43. Identify a molecule which does not exist.

A. He_2

B. Li_2

C. C_2

D. O_2

Answer: A

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44. The following metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.

A. *Iron*

B. *Copper*

C. *Calcium*

D. *Potassium*

Answer: D

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45. The number of protons, neutrons and electrons in $175_{71}Lu$, respectively, are:

A. 71, 104 and 71

B. 104, 71 and 71

C. 71, 71 and 104

D. 175, 104 and 71

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