CHEMISTRY

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 1

Chemistry

1. The radius ratio of KF is 0.98. The structure of KF is of the type

A. NaCl

B. ZnS

C. CsCl

D. Graphite

Answer: C

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2. Consider the followng cell reaction

$2Fe(s) + O_2(g) + 4H^+(aq) \rightarrow 2Fe^{2+}(aq) + 2H_2O(l)$ If $E_{cell} = E^\circ_{cell}$ at $25^\circ C$ and $\left[Fe^{2+}\right] = 10^{-3}M$, $P_{O_2} = 0.01$ atm and $pH - x$ value of x is

A. 1

B. 2

C. 3

D. 4

Answer: A

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3. Which of the following does not illustrate the anomalous properties of lithium?

A. Li is much softer than the other group first metals

B. The melting point and boiling point of Li are comparatively high

C. Li forms a nitride Li_3N unlike group 1 metals

D. The ion of Li and its compound are more heavily hydrated then those of rest of the group 1 elements

Answer: A

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4. $N_2 + 3H_2 \rightarrow 2NH_3$. 1 mol N_2 and 4 mol H_2 are taken in 15L flask at $27^\circ C$ After complete conversion of N_2 into NH_3, $5L$ of H_2O is added. pressure set up in the flask is:

A. $\frac{3 \times 0.0821 \times 300}{15}$atm

B. $\frac{2 \times 0.0821 \times 300}{10}$ atm

C. $\frac{1 \times 0.0821 \times 300}{15}$ atm

D. $\frac{1 \times 0.0821 \times 300}{10}$atm

Answer: D

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5. The vapours of Hg absorb some electrons accelerated by a potential difference of 4.5 volt as a result of it light is emitted. If the full energy of single incident e^- is supposed to be converted into light emitted by single Hg atom, find the wave no. of the light.

A. $3.63 \times 10^6 m^{-1}$

B. $5.93 \times 10^6 m^{-1}$

C. $5.93 \times 10^6 cm^{-1}$

D. $5.62 \times 10^6 m^{-1}$

Answer: A

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6. Which of the following conditions help melting of ice?

A. High temperature and high pressure

B. High temperature and low pressure

C. Low temperature and low pressure

D. Low temperature and high pressure

Answer: A

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7. Identify the correct statement:

A. Corrosion of iron can be minimized by forming a contact with another metal with a higher reduction potential

B. Iron corrods in oxygen-free water

C. Corrosion of iron can be minimized by forming an impermeable barrier at its surface

D. Iron corrodes more rapidly in salt water because its electrochemical potential is higher

Answer: C

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8. Four thousand active nuclei of a radioactive material are present at $t = 0$. After 60 minutes 500 active nuclei are left in the sample. The decay constant of the sample is

A. $\frac{\ln(20)}{60}$ per minute

B. $\frac{\ln(2)}{20}$ per minute

C. $20\ln(2)$ per minute

D. $60\ln(2)$ per minute

Answer: B

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9. A crystalline hydrated salt on being rendered anhydrous, loses $45.6\,\%$ of its weight. The percentage composition of anhydrous salt is : $Al = 10.5\,\%$, $K = 15.1\,\%$, $S = 24.8\,\%$ and $I = 49.6\,\%$. Find the empirical formula of the anhydrous and crystalline salt :

A. $K_2SO_4.\ Al_2(SO_4)_3.24H_2O$

B. $K_2SO_4.\ Al_2(SO_4)_3.12H_2O$

C. $K_2SO_4.\ Al_2(SO_4)_3.6H_2O$

D. $K_2SO_4.\ Al_4(SO_4)_6.48H_2O$

Answer: A

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10. Acetylene can be obtained by the reaction

A. $HCOOK \xrightarrow{\text{Electrolysis}}$

B. $CHI_3 + 6Ag + CHI_3 \xrightarrow{\Delta}$

C. $CH_3CH_2OH \xrightarrow[443^\circ C]{\text{conc.}H_2SO_4}$

D. $Be_2C + H_2O \rightarrow$

Answer: B

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11. Which one of the following ore is best concentrated by froth flotation method:

A. Galena

B. Malachite

C. Magnetite

D. Cassiterite

Answer: A

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12. When an inorganic compound (X) having $(3c, 2e)$ as well as $(2c, 2e)$ bonds reacts with ammonia gas at a certain temperature and gives a compound (Y). Which is isostructural with benzene. Compound (X) with ammonia at very high temperature gives (Z) also known as inorganic graphite. Identify (X), (Y) and (Z).

A. X is BH_3, Y is $B_2N_2H_3$, Z is inorganic benzene

B. X is B_2H_6, y is $B_3N_3H_6$, Z is boron nitride

C. X is borax Y is B_2O_3, Z is inorganic benzene

D. none

Answer: B

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13. Which of the following is a biradical?

A. Phenyl

B. Propenyl

C. Vinylidene

D. Ethylidene

Answer: C

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14. The number of σ bonds in P_4O_{10} is

A. 6

B. 7

C. 17

D. 16

Answer: D

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15. At 500 K, the half-life period of a gaseous reaction at the initial pressure of 80 kPa is 350 sec. When the pressure is 40 kPa, the half life period is 175 sec. The order of reaction is

A. zero

B. one

C. two

D. three

Answer: A

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16. In aqueous solution the ionization constants for carbonic acid are:

$K_1 = 4.2 \times 10^{-7}$ and $K_2 = 4.8 \times 10^{-11}$

Select the correct statement for a saturated $0.034M$ solution of the carbonic acid.

A. The concentration of H^+ is double that of CO_3^{2-}

B. The concentration of CO_3^{2-} is 0.034

C. The concentration of CO_3^{2-} is greater then that of HCO_3^-

D. The concentration of H^+ and HCO_3^- are approximately equal

Answer: D

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17. Consider the following three halides:

1. $CH_3 - CH_2 - Cl$

2. $CH_2 = CH - Cl$

3. $C_6H_5 - Cl$

Arrange C-Cl bond length of these compounds in decreasing order

A. $1 > 2 > 3$

B. $1 > 3 > 2$

C. $3 > 2 > 1$

D. $2 > 3 > 1$

Answer: A

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18. The structure of $XeOF_4$ is

A. Trigonal bipyramidal

B. Square pyramidal

C. Pentagonal planar

D. Octahedral

Answer: B

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19. Match the polymers in column -A with their main uses in Column B and choose the correct answer:

	Column - A		Column - B
A.	Polystyrene	i.	Paints and lacquers
B.	Glyptal	ii.	Rain coats
C.	Polyvinyl chloride	iii.	Manufacture of toys
D.	Bakelite	iv.	Computer discs

A. A-iii, B-i, C-ii, D-iv

B. A-ii,B-i,C-iii,D-iv

C. A-ii,B-iv,C-iii,D-i

D. A-iii,B-iv,C-ii,D-i

Answer: A

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20. Ratio of $\frac{\Delta T_b}{K_b}$ of 10 g AB_2 and 14g A_2B per 100 g of solvent in their respective, solution (AB_2 and A_2B both are non-electrolytes) is 1 mol/kg in both cases. Hence, atomic wt. of A and B are respectively.

A. 100,40

B. 60,20

C. 20,60

D. None of these

Answer: B

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21. Calculate heat of atomization of furan using the data

$$\Delta H^{\circ}_{f\left(\text{  }\right)} = -62.0 \text{ KJmol}^{-1}$$

Heat of atomization of C,H,O are $717,\ 218,\ 249 KJ\text{mol}^{-1}$ each.

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22. How many isomers of $C_4H_{10}O$ reacts with Na metal to evolve H_2 gas ? (excluding stereoismer)

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23. In a process, $701J$ of heat is absorbed by a system and $394J$ of work is done by the system. What is the change in internal energy for the process?

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24. The values of electronegativity of atom A and B are 1.20 and 4.0 respectively. The percentage of ionic character of A-B bond is nearly

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25. Calculate the molality of Kl if the density of 20% (mass/mass) aqueous Kl is $1.202 gmL^{-1}$. And report your final answer by rounding off the molality correct upto one place of decimal, and then multiply it by 10.

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26. The colour of $KMnO_4$ is due to

A. $\sigma - \sigma^*$ transition

B. $M \rightarrow L$ charge transfer transition

C. d - d transition

D. $L \rightarrow M$ charge transfer transition

Answer: D

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27. An open vessel at $27^\circ C$ is heated until 3/8th of the air in it has been expelled. Assuming that the volume remains constant, calculate the temperature at which the vessel was heated

A. $307^\circ C$

B. $107^\circ C$

C. $480^\circ C$

D. $207^\circ C$

Answer: D

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28. Which of the following compounds display geomertical isomerism ?

A. $H_2C = CHBr$

B. $H_2C = CBr_2$

C. $(Cl)HC = CH(Br)$

D. $Br_2C = CCl_2$

Answer: C

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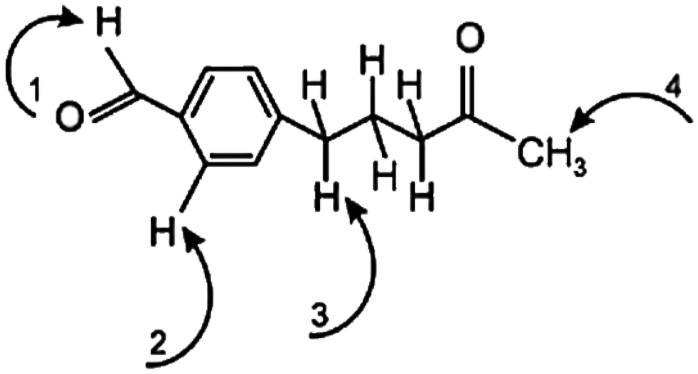
29. Choose from the indicated protons, the one that is most acidic



A. 1

B. 2

C. 3

D. 4

Answer: D

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30. A petroleum fraction having boiling range $70 - 200^{\circ} C$ and cotaining 6 - 10 carbon atoms per molecule is called

A. Natural gas

B. Gas oil

C. Gasoline

D. Kerosene

Answer: C

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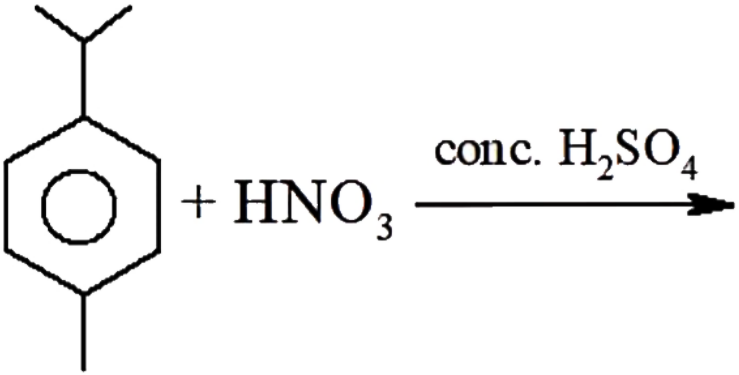
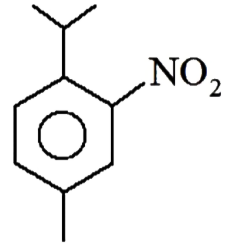
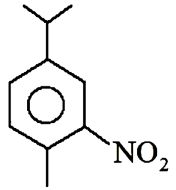
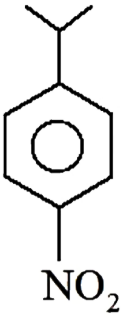
31. The major product formed in the reaction is :



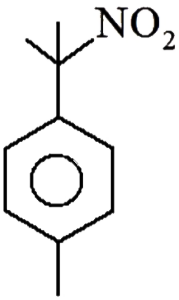
A. 

B. 

C.



D.



Answer: B

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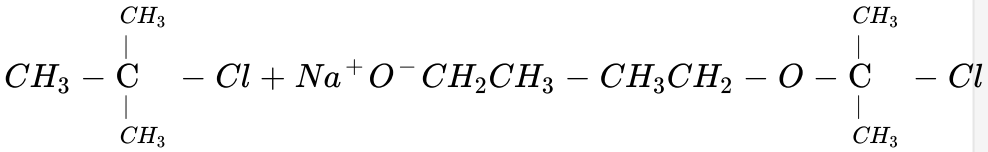
32. Which of the following reactions is/are feasible?

A. $CH_3CH_2Br + \overset{+}{N}a\overset{-}{O} - \underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}} - CH_3 \rightarrow CH_3CH_2O - \underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}} - CH_3$

B.



C. Both (a) and (b)

D. None of the above

Answer: A

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33. For the reaction mechanism of the reaction

$(2NO(g) + 2H_2(g)) \rightarrow N_2(g) + 2H_2O(g)$

$\left(\text{Step I}: 2NO \overset{k_1}{\Longleftrightarrow} N_2O_2 K_{eq}(\text{fast})\right)\left(\text{Step II}: N_2O_2 + H_2 \overset{k_2}{\longrightarrow} N_2O + H_2O\right.$

Expression of rate of reaction is

(Take $K_{eq} \times k_2 = k'$)

A. $k'[NO]^2[H_2]$

B. $k' N_2O_2[H_2]$

C. $k' N_2O[H_2]$

D. $k' N_2O_2$

Answer: A

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34. The pK_a of acetic acid and pK_b of ammonium hydroxide are 4.76 and 4.75 respectively. Calculate the pH of ammonium acetate solution.

A. 9.51

B. 7.005

C. 7.00

D. 6.9

Answer: B

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35. Which among the following elements have the lowest value of IE_1?

A. Pb

B. Sn

C. Si

D. C

Answer: B

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36. Metal which can be extracted from all three dolomite, magnesite and caranallite is

A. Na

B. K

C. Mg

D. Ca

Answer: C

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37. Bleeding is stopped by the application of ferric-chloride this is because:

A. The blood starts flowing in opposite direction

B. The blood reacts and forms a solid, which seals the blood vessel

C. The blood is coagulated and thus the blood vessel is sealed

D. The ferric chloride seals the blood vessel

Answer: C

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38. Which one of the following cannot be prepared from B_2H_6 ?

A. $NaBH_4$

B. $B_2(CH_3)_4H_2$

C. $B_2(CH_3)_6$

D. H_3BO_3

Answer: C

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39. Gabriel synthesis is used for the preparation of

A. Primary amines

B. Primary alcohols

C. Tertiary amines

D. Tertiary alcohols

Answer: A

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40. Alkanamines have the general formula -

A. $C_nH_{2n-1}N$

B. $C_nH_{2n+3}N$

C. $C_nH_{2n+1}N$

D. $C_nH_{2n-3}N$

Answer: B

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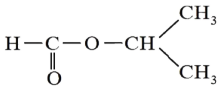
41. An ester $A(C_4H_8O_2)$, on treatement with excess of methyl magnesium bormide followed by acidification, gives an alcohol B as the sole organic product. Alcohol B on oxidation with $NaOCl$ followed by acidification gives acetice acid. Deduce the structures of A and B. Show the reactions involved.

A. 

B. $CH_3 - \underset{\underset{O}{\|}}{C} - O - CH_2CH_3$

C. $H - \underset{\underset{O}{\|}}{C} - O - CH_2CH_2CH_3$

D. $CH_3CH_2 - \underset{\underset{O}{\|}}{C} - O - CH_3$

Answer: A

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42. A body centre cubic lattice is made up of two different types of atoms A and B. Atom A occupies the body centre and B occupying the corner positions. One of the corners is left unoccupied per unit cell. Empirical formula of such a solid is

A. AB

B. A_2B_2

C. A_5B_7

D. A_8B_7

Answer: D

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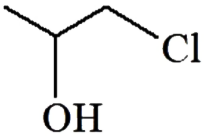
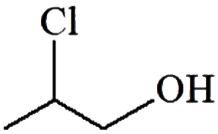
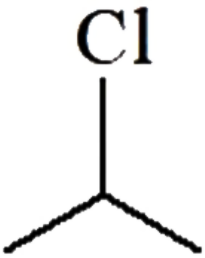
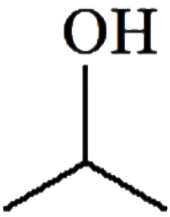
43. Propene on reaction with hypochlorous acid gives ?

A. 

B. 

C. 

D. 

Answer: A

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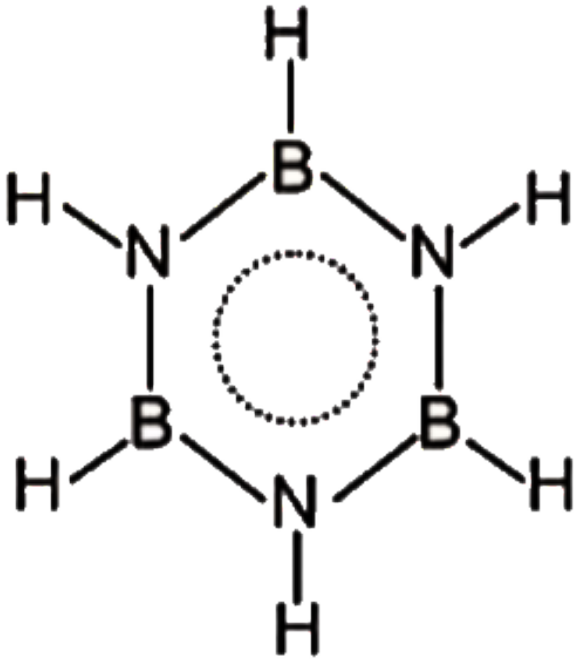
44. The structure of $B_3N_3H_6$ is as follows :



How many derivative structures of $B_3N_3H_4X_2$ can be derived from the basic structure, by the replacement of two hydrogen atoms ?

A. 2

B. 3

C. 4

D. 5

Answer: C

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45. Standard entropies of X_2, Y_2 and XY_3 are 60, 30 are $50JK^{-1}mol^{-1}$ respectively. For the reaction $\frac{1}{2}X_2 + \frac{3}{2}Y_2 \Leftrightarrow XY_3, \Delta H = -30kJ$ to be at equilibrium, the temperature should be :

A. 1200 K

B. 1000 K

C. 750 K

D. 500 K

Answer: A

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46. How many complexes among the following are paramagnetic

$[Mn(CN)_6]^{3-}$, $[Cr(H_2O)_6]^{3+}$, $[Co(en)_3]^{3+}$,

$[V(CO)_6]$, $[Ni(NH_3)_6]^{2+}$, $[Ni(dmg)_3]$,

$[Pt(Cl)_2, (NH_3)_2]$. $[Cu(NH_3)_4]^{2+}$, $[Cu(CN)_4]^{3-}$

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47. P_4O_6 reacts with water according to equation $P_4O_6 \rightarrow 4H_3PO_3$. Calculate the volume of $0.1MNaOH$ solution required to neutralise the acid formed by dissolving 1.1g of P_4O_6 in H_2O.

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48. A mixture of $CaCO_3$ and $MgCO_3$ weighing $1.84g$ on heating left a residue weighing $0.96g$. Calculate the percentage of each in the mixture.

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49. The change in the oxidation state of iodine when axcess chlorine water is added to an iodide salt is

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50. A light of wavelength 3000Å falls on a metal surface. Ejected e^- is further accelerated by a potential difference of 2V, then final K.E of the e^- is found to be $8 \times 10^{-19} J$. If threshold energy for the metal surface is $'\phi' eV$. Then find the numerical value of 8ϕ

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51. The formation of cyanohydrin from ketone is an example of :

A. Electrophilic addition reaction

B. Electrophilic substitution reaction

C. Nucleophilic substitution reaction

D. Nucleophilic addition reaction

Answer: D

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52. 2.56×10^{-3} equivalent of KOH is required to neutralise $0.12544 g H_2XO_4$.The atomic mass of X (in $g/$ mol) is :

[Given : H_2XO_4 is a dibasic acid]

A. 16

B. 8

C. 7

D. 32

Answer: D

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53. Match list I with List II and select the correct answer using the codes given below

	List I (types of ore)		List II (example)
P	Oxide ore	$A.$	Feldspar
Q	Sulphide ore	$B.$	Barytes
R	sulphate ore	$C.$	Fluorspar
S	Halide ore	$D.$	Galena
		$E.$	Corundum

A. P-B,Q-D,R-C,S-A

B. P-B,Q-D,R-E,S-A

C. P-E,Q-B,R-D,S-C

D. P-E,Q-D,R-B,S-C

Answer: D

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54. The carbon -carbon bond distance in benzene is

A. Longer than a C -C single bond

B. Longer than a C=C double bond

C. Shorter than a C=C double bond

D. Shorter than a C=C triple bond

Answer: B

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55. Which of the following is less than zero during adsorption?

A. ΔG

B. ΔS

C. ΔH

D. ΔH, ΔG and ΔS

Answer: D

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56. Consider the following statements:

(I) La$(OH)_3$ is the least basic among the hydroxides of lanthanoids.

(II) Zr^{4+} and Hf^{4+} possess almost same ionic radii.

(III) Cr^{4+} can act as an oxidising agent .

which of the above statement is/ are true?

A. I and III

B. I only

C. II and III

D. II and III

Answer: C

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57. The solubility of N_2 in water at 300K at 300K and 500 torr partial pressure $0.01gL^{-1}$. The solubility (in gL^{-1}) at 750 torr partial pressure is :

A. 0.0075

B. 0.005

C. 0.02

D. 0.015

Answer: D

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58. For the reaction $2A(g) + B(g) \Leftrightarrow C(g) + D(g)$, $K_c = 10^{12}$.if initially 4,2,6,2 moles of A,B,C,D respectively are taken in a 1 litre vessel, then the equilibrium concentration of A is :

A. 4×10^{-4}

B. 2×10^{-4}

C. 10^{-4}

D. 8×10^{-4}

Answer: A

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59. Which of the following compound is not formed in haloform reaction ?

A. CHF_3

B. $CHCl_3$

C. CHI_3

D. $CHBr_3$

Answer: A

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60. Which pair of the following chlorides does not impart color to the flame ?

A. $BeCl_2$ and $SrCl_2$

B. $BeCl_2$ and $MgCl_2$

C. $CaCl_2$ and $BaCl_2$

D. $MgCl_2$ and $CaCl_2$

Answer: B

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61. Which of the following complexes is expected to have lowest Δ_0 value ? [consider only magnitude]

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

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

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

D. $[CoF_6]^{3-}$

Answer: D

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62. ClO_2 is an / a

A. anhydride of $HClO_2$

B. anhydride of $HClO_3$

C. mixed anhydride of $HClO_2$ and $HClO_3$

D. mixed anhydride of $HClO_3$ and $HClO_4$

Answer: C

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63. What is $\left[H^+\right]$ in a solution that is 0.01 M in HCn and 0.02 M in NaCN ?

(K_a for HCN 6.2×10^{-10})

A. 3.1×10^{10}

B. 6.2×10^{5}

C. 6.2×10^{-10}

D. 3.1×10^{-10}

Answer: D

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64. Consider the reaction:

$2NO(g) + O_2(g) \rightarrow 2NO_2(g)$

Calculated the standard Gibbs energy change at $298K$ and predict whether the reaction is spontaneous or not. $\Delta_f G^{\Theta}(NO) = 86.69 kJmol^{-1}$, $\Delta_f G^{\Theta}(NO_2) = 51.84 kJmol^{-1}$.

A. Yes, spontaneous

B. No, the reaction is Non-spontaneous

C. Equilibrium

D. cannot predict

Answer: A

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65. Which of the following represents the incorrect order of properties ?

A. $NaCl < MgCl_2 < AlCl_3 < SiCl_4$ (order of ionic character)

B. $BeCO_3 < MgCO_3 < CaCO_3 < BaCO_3$

(order of thermal stability)

C. $LiH > NaH > KH > RbH > CsH$

(order of thermal stability)

D. $BeSO_4 > MgSO_4 > CaSO_4 > BaSO_4$

(Order of solubility in water)

Answer: A

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66. Compound 'A' of molecular formula $C_4H_{10}O$ on treatment with Lucas reagent at room temperature gives compound 'B'. When compound 'B' is heated with alcoholic KOH, it gives isobutene. Compound 'A' and 'B' are respectively :

A. 2-Methyl -2-propanol and 2-Methyl -2-chloropropane

B. 2-Methyl-1-propanol and 1-Chloro-2-methylpropane

C. 2-Methyl-1-propanol and 2-Methyl-2-chloropropane

D. Butan-2-ol and 2-Chlorobutane

Answer: A

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67. Which of the following exhibits tautomerism ?

A. $(CH_3)_2NH$

B. $(CH_3)_3CNO$

C. R_3CNO_2

D. RCH_2NO_2

Answer: D

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68. The radius of Na^+ is 95pm and that of Cl^- is 181 pm. The edge length of unit cell in NaCl would be (pm).

A. 276pm

B. 138 pm

C. 552 pm

D. 415 pm

Answer: C

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69. The wavelength of the spectral line when the electron is the hydrogen atom undergoes a transition from the energy level 4 to energy level 2 is.

A. 185.2 nm

B. 285.2 nm

C. 385.2 nm

D. 486.4nm

Answer: D

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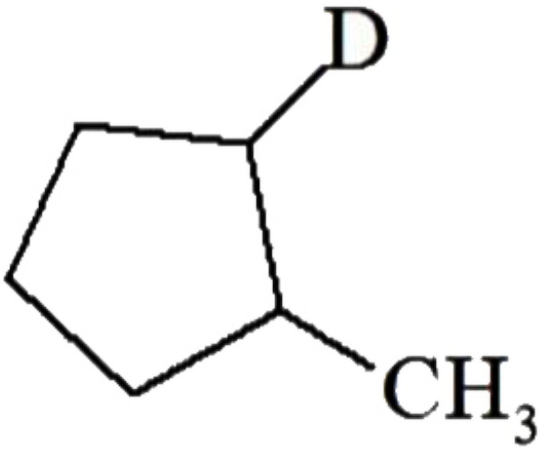
70. Which of the following is used for the conversion of 1-methylcyclopentene to



A. BD_3 THF followed by CH_3COOH

B. BH_3 THF followed by CH_3COOD

C. BH_3 THF followed by CH_3COOH

D. BD_3 THF followed by CH_3COOD

Answer: B

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71. A carbony compound of formula $C_9H_{10}O(A)$, which is a benzene derivative gives orange precipitate with 2,4-D.N.P. and also gives yellow precipitate with I_2 in presence of aqueous NaOH. The total no. of isomers possible for 'A' are _____

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72. Number and type of bonds between two carbon atoms in CaC_2 are :

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73. How many optically active stereoisomers are possible for butane-2, 3-diol ?

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74. For a first order reactions, the half -life is 10 mins. How much time in minutes will it take to reduce the concentration of reactant to 25% of its original concentration ?

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75. Statement-I: Polar solvent slows down S_{N^2} reaction.

Because Statement-II: $CH_3 - Br$ is less reactive than CH_3CI.

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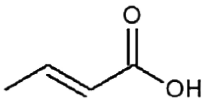
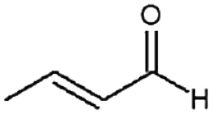
76. $H - C \equiv C - H \xrightarrow[H_2SO_4]{HgSO_4} \xrightarrow{\text{dil.NaOH}} \xrightarrow{\Delta} P$. The final product P is

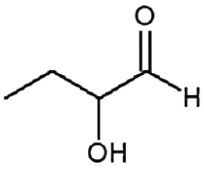
A.



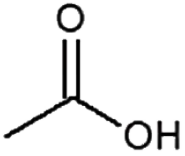
B.



C.



D.



Answer: B

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77. Suppose 60% w/w aqueous solution of glucose ($C_6H_{12}O_6$) and 20% w/w aqueous solution of urea (NH_2CONH_2) have equal molarity, then which solution has higher density :

A. Both have equal density

B. Glucose solution

C. Urea solution

D. Cannot be predicted

Answer: A

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78. The oxidation number of Mn in the product of alkaline oxidative fusion of MnO_2 is

A. 4

B. 5

C. 6

D. 7

Answer: C

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79. Prop-1-ol can be prepared from propene

A. H_2O / H_2SO_4

B. $Hg(OAc)_2$, H_2O followed by $NaBH_4$

C. B_2H_6 followed by H_2O_2

D. CH_3COOH, H_2SO_4

Answer: C

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80. As_2S_3 and TiO_2 sol are examples of

A. Negativity charges sols

B. Positively charged sols

C. Positively and negatively charged sols respectively

D. Negatively and positively charged sold respectively

Answer: D

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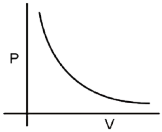
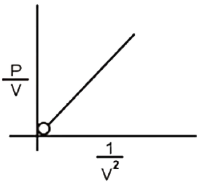
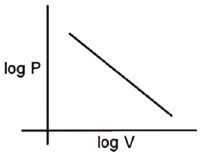
81. Which of the following graph represents Boyle's law ?

A. 

B. 

C. 

D. All of these

Answer: D

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82. Which of the following coordination compounds has maximum number of isomers ?

A. $\left[Pt(NH_3)_4Cl_2\right]^{2+}$

B. $\left[Pt(gly)_3\right]^{2-}$

C. $\left[Pt(en)_3\right]^{4+}$

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

Answer: B

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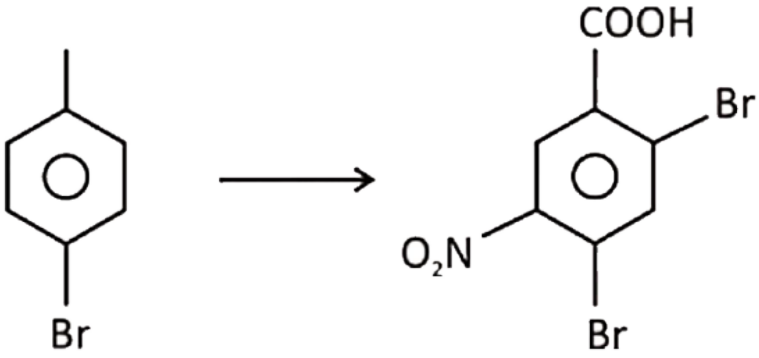
83. Observe the following conversion .



Which of following is best correct sequence of rection for following conversion ?

A. $Br_2 / FeBr_3$ (1.eq) (ii) $KMnO_4 / \Delta$ (iii) Conc. $HNO_3 + H_2SO_4$

B. (i) Conc. $HNO_3 + H_2SO_4$ (ii) $Br_2 / FeBr_3$(1. eq) (iii) $KMNO_4 / \Delta$

C. (i) $KMNO_4 / \Delta$ (ii) Conc. $HNO_3 + H_2SO_4$ (iii) $Br_2 / FeBr_3$ (1 eq.)

D. (i) $Br_2 / FeBr_3$ (1 eq.) (ii) Conc. $HNO_3 + H_2SO_4$ (iil) $KMnO_4 / \Delta$

Answer: A

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84. $SOCl_2 + HOH \rightarrow [X] + [Y]$

Which of the following is / are incorrect statements (s) ?

(I) One of the products in a gas having sp^3d hybridization.

(II) Both the products are strong acids.

(II) One of the product has one $p\pi - d\pi$ bond.

(IV) One of the product when react with NH_3 gives white fumes.

A. II,IV

B. I,II

C. I,II,III

D. II,III

Answer: B

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85. Match List-I with List-II and select the correct answer :

List-I (Ion)		List-II (Shapes)	
(a)	ICl_2^-	(1)	Linear
(b)	BrF_2^+	(2)	Pyramidal
(c)	ClF_4^-	(3)	Tetrahedral
(d)	$AlCl_4^-$	(4)	Square planar
		(5)	Angular

A. a-1,b-2,c-4,d-5

B. a-4,b-5,c-2,d-3

C. a-1,b-5,c-4,d-3

D. a-5,b-1,c-3,d-4

Answer: C

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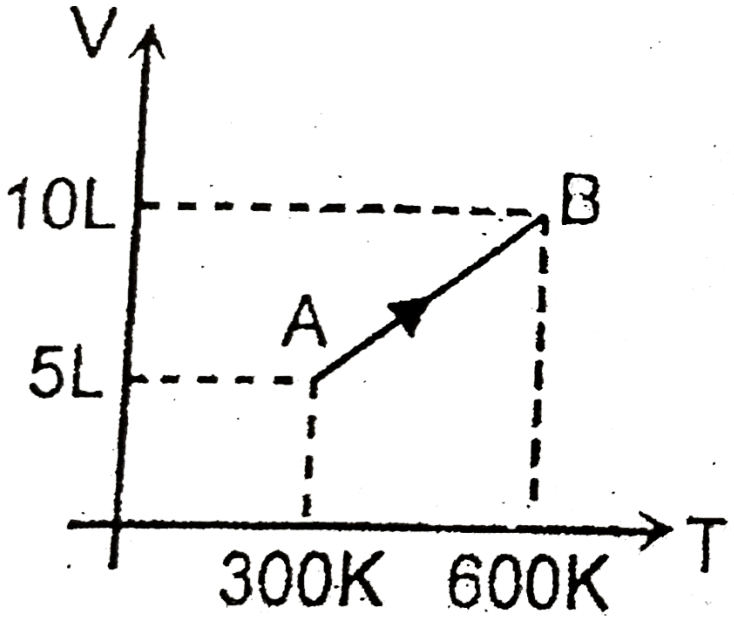
86. One mole of an ideal gas was taken from $A \to B$ as shown in given figure. Mangutitude of work involved in process is $\left(R = \frac{25}{3}\frac{J}{molK}\right)$:



A. 5kJ

B. 7.5 kJ

C. 2.5kJ

D. None of these

Answer: C

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87. Which of the following statements is incorrect for hydrogen peroxide ?

A. It is stored in plastic bottles in dark

B. It acts as an oxidizing as well as a reducing agent.

C. It is used as a bleaching agent.

D. It has acidic as well as basic properties.

Answer: D

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88. A condensation polymer among the following polymer is

A. Teflon

B. Polystyrene

C. PVC

D. Dacron

Answer: D

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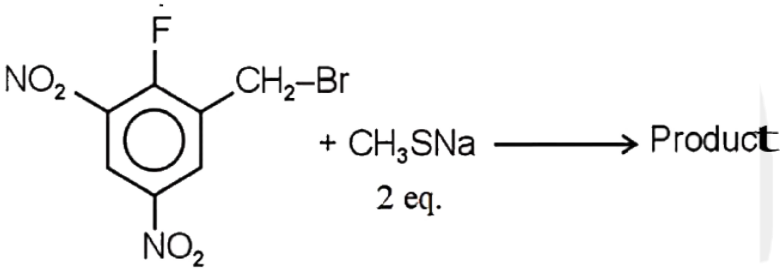
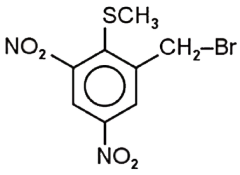


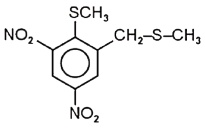
89.

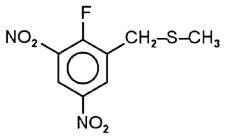
Which of the folloiwng is obtained product

A.



B.



C. 

D. None of these

Answer: B

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90. $r_{Na^+} = 195\text{pm}$ and $r_{Cl^-} = 281\text{pm}$ in NaCl (rock salt) structure. What is the shortest distance between Na^+ ions ?

A. 778.3 pm

B. 673 .06 pm

C. 195.7pm

D. 390.3 pm

Answer: B

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91. For reactions $A \to B$ and $P \to Q$ Arrhenius constant are 10^8 and 10^{10} respectively. If $E_{A \to B} = 600 cal/$ mole and $E_{P \to Q} = 1200 cal/$ mole, then find the temperature at which their rate constants are same (Given : $R = 2 cal/$ mole $/$ K)

A. 600K

B. $300 \times 4.606 K$

C. $\frac{300}{4.606} K$

D. $\frac{4.606}{600} K$

Answer: C

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92. Radiation corresponding to the transition n = 4 to n = 2 in hydrogen atoms falls on a certain metal(work function = 2.0 eV). The maximum kinetic energy of the photoelectrons will be :

A. 0.55 eV

B. 2.55 eV

C. 4.45 eV

D. None

Answer: A

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93. 2.0 molal aqueous solution of an electrolyte X_2Y_3 is 75% ionised. The boiling point of the solution a 1 atm is $\left(K_{b(H_2O)} = 0.52K \text{ kg } mol^{-1}\right)$

A. 2.74 .76 K

B. 377 K

C. 376.4K

D. 377.16 K

Answer: D

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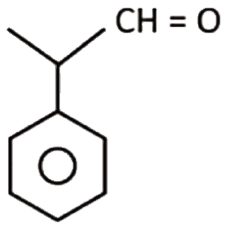
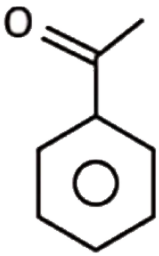
94. $P \xrightarrow{PCl_5, 0^\circ C} Q \xrightarrow[-2HCl\,(ii)\,H^+]{(i)\,NaNH_2\,(\text{excess})} R \xrightarrow{NaNH_2} S \xrightarrow{I-CH_3} T -$ P is

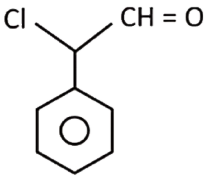
A.

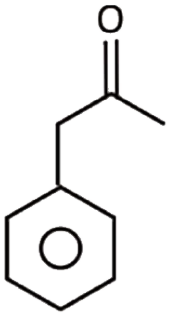


B.



C.



D. 

Answer: B

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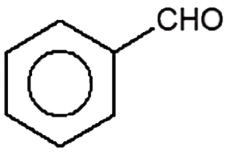
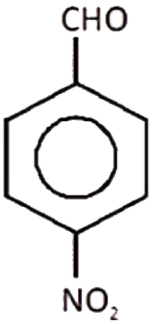
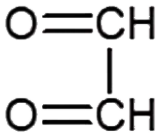
95. Which of the following will show cannizzaro reaction :

A. 

B. 

C. 

D. All of these

Answer: D

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96. In the reaction :

$Zn + NaNO_3 + NaOH \rightarrow Na_2ZnO_2 + A + H_2O$

The sum of stoichiometric coefficients of Zn and A in the balanced reaction with simplest integer coefficient is

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97. If the concentration of $\left[NH_4^+\right]$ in a solution having 0.02 M $NH_3$and 0.005 M Ca $(OH)_2$ is $a \times 10^{-6}$ M,determine a.

$\left[k_b(NH_3) = 1.8 \times 10^{-5}\right]$

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98. EMF of the following cell is 0.6 volt.

$Ag(s)|AgBr(s)|KBr(0.01m)|AgNO_3(0.001M)|Ag(s)$

K_{sp} of AgBr is expressed as 1×10^{-x} , x is [Take $\frac{2.303RT}{F} = 0.06V$]

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99. Find the sum of maximum number of electrons having $+1$ and -1 value of 'm' in Ti

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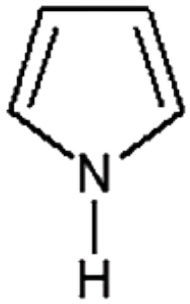
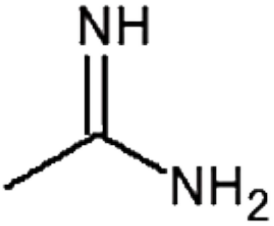
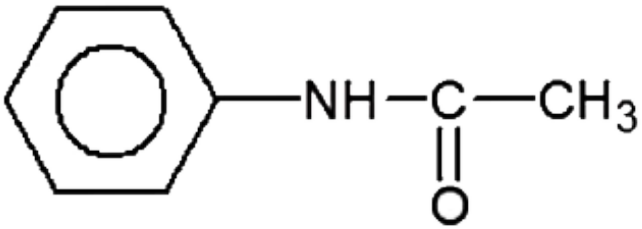
100. How many compounds are less basic than aniline.

(iii) 

(iv) NH_3

(v) 

(vi) 

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101. A metallic element exists in cubic lattice. Each edge of unit cell is 4 Å. The density of metal is $6.25 g/m^3$. How many unit cells will be present in 100 g of metal?

A. 1×10^{22}

B. 2.5×10^{29}

C. 5×10^{23}

D. 2×10^{23}

Answer: B

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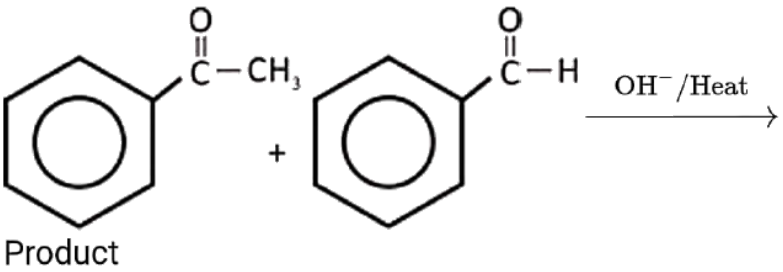
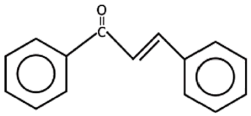
102. Complete the following reaction



A. 

B. $Ph - \overset{O}{\overset{\|}{C}} - CH_2 - CH_2 - Ph$

C. $Ph - CH = CH - \underset{OH}{\underset{|}{CH}} - Ph$

D. $Ph - CH = C = CH - Ph$

Answer: A

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103. The vapour pressure of pure liquid A is 10 torr and at the same temperature when 1 g solid B is dissolved in 20g of A , its vapour pressure is reduced to9.0torr . If the molecular mass of A is 200amu , then the molecular mass of B is

A. 100 amu

B. 90 amu

C. 75 amu

D. 120 amu

Answer: B

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104. The gas obtained by roasting of sulphide ore is reacted with acidified potassium dichromate. A green colored compound 'X' is formed. The compound X can be :

A. SO_2

B. $Cr_2(SO_4)_3$

C. Cl_2

D. CrO_2Cl_2

Answer: B

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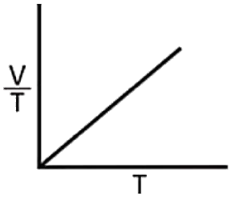
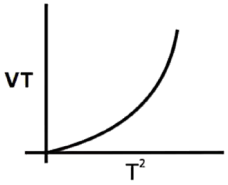
105. Which of the following curve is correct for a given amount of an ideal gas at constant pressure?

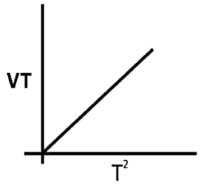
A.



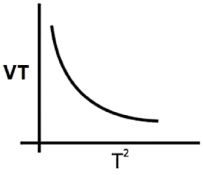
B.



C.



D.



Answer: C

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106. The standard molar heats of formation of ethane, carbon dioxide, and liquid water are -21.1, -94.1, and $-68.3kcal$, respectively. Calculate the standard molar heat of combustion of ethane.

A. $-372kcal/mol$

B. $162kcal/mol$

C. $-240kcal/mol$

D. $183.5kcal/mol$

Answer: A

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107. Diborane reacts with ammonia to initially forms X which on further heating gives borazine X is

A. $BH_3.NH_3$

B. $B_2H_6.NH_3$

C. $B_2H_6.2NH_3$

D. $NH_3BH_3NH_3$

Answer: C

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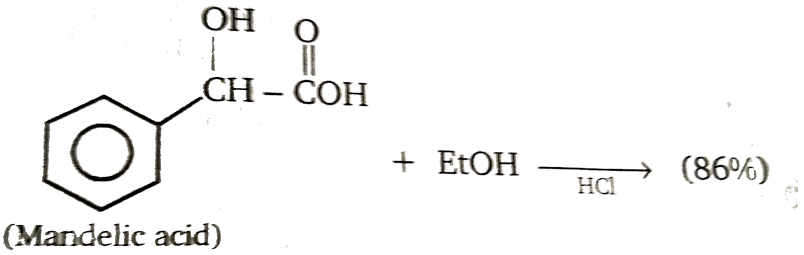
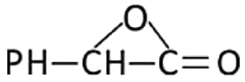


(Mandelic acid)

108.

Identify product of above Fischer esterification reaction :

A. $PH - \overset{OEt}{\overset{|}{CH}} - COOH$

B. 

C. $PH - \underset{OH}{\underset{|}{CH}} - CO_2Et$

D. $PH - \underset{OH}{\underset{|}{CH}} - \overset{O}{\overset{||}{C}} - Et$

Answer: C

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109. Which of the following statement is wrong

A. $[RuCl_6]^{2-}$ has a t_{2g}^4 configuration

B. $\left[Fe(Ox)_3\right]^{3-}$ is a low spin complex

C. Pairing energy of 4d and 5d series metal tend to be lower than the 3d series metals

D. Number of unpaired electrons in $\left[Mn(CN)_6\right]^{3-}$ is 2

Answer: B

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110. Lithium hydride reacts with aluminum chloride to form a complex. The geometry of the complex and the ligand present in the complex is

A. Octahedral, chloride

B. Tetrahedral, hydride

C. Octahedral, bridging chloride

D. Tetrahedral, Chloride and hydride

Answer: B

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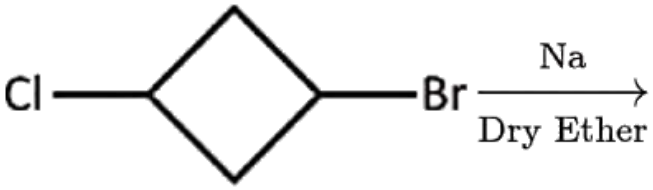
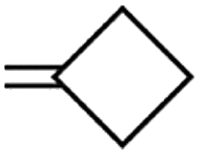


111.

A. 

B. 

C. 

D. 

Answer: B

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112. The gas which has similar shape and bond order as that of azide ion is:

A. Sulphur dioxide

B. Ozone

C. Sulphur trioxide

D. Carbon dioxide

Answer: D

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113. The incorrect order of first ionization energy is:

A. $Au > Cu > Ag$

B. $Pt > Ni > Pd$

C. $C > Pb > Sn$

D. $B > Ga > Al$

Answer: B

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114. Oxidation state of iron and chromium in chromite ore is :

A. 2,3

B. 3,2

C. 2,2

D. 3,3

Answer: A

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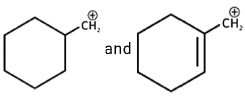
115. Some pairs of ions are given below. In which pair, first ion is more stable than second ?

A. $CH_3 - \overset{\oplus}{C}H - CH_3$ and $CH_3 - \overset{\oplus}{C}H - OCH_3$

B. $CH_3 - CH_2 - \overset{\oplus}{C}H - CH_3$ and $CH_3 = CH - CH_2 - \overset{\oplus}{C}H$

C. 

D. $\begin{matrix} CH_3 - CH - CH_3 \\ | \\ CH_3 - \underset{\oplus}{C} - CH_3 \end{matrix}$

Answer: B

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116. The solubility of AB_2 is 0.05 g per 100 mL at $25^\circ C$.Calculate K_{sp} of AB_2 at $25^\circ C$? [Atomic mass of A = 20 amu, atomic mass of B = 40 amu]

A. 10^3

B. 5×10^{-7}

C. 10^{-6}

D. 5×10^{-3}

Answer: B

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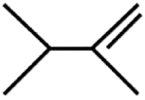
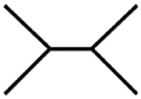
117. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{Br}{|}}{CH} - CH_3 \xrightarrow[\Delta]{\text{El mechanism}} (A)$

Major product (A) is

A. 

B. 

C. 

D. 

Answer: B

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118. incorrect statement related to extraction of copper from copper pyrite is:

A. Iron sllicate is obtained as slag

B. Copper matte in the form of $CuS + FeS$ is obtained

C. Copper is obtained by self reduction

D. Blister copper is obtained after reduction process

Answer: B

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119. Aniline is prepared in presence of Fe/HCl from

A. Benzene

B. Nitrobenzene

C. Dinitrobenzene

D. Aniline

Answer: B

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120. Which of the following sols is negatively charged?

A. Ferric hydroxide

B. Aluminium hydroxide

C. Aresenious sulphide

D. Silver iodide in silver nitrate solution

Answer: C

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121. How many isomer of C_4H_8O when reacts with CH_3MgBr followed by acidification to give 2° alcohol (only consider carbonyl isomers) ?

(including stereoisomer)

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122. How many acidic group is present in given amino acid ?

$$\overset{\oplus}{N}H_3 - \underset{\underset{CO_2^-}{|}}{CH} - CH_2 - CO_2H$$

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123. Four different solution containing 1M each of $Au^{+3}, Cu^{+2}, Ag^{+}, Li^{+}$ are being electrolysed by using inert electrodes. In how many samples, metal ions would be deposited at cathode?

$[\text{Given}: E^0_{Ag^+/Ag} = 0.8, E^0_{Au^{+3}/Au} = 1.00V$

$E^0_{Cu^{+2}/Cu} = 0.34V, E^0_{Li^+/Li} = -3.03V]$

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124. 16 g of a radio active substance is reduced to 0.5 g after 1 hour. The half life of the radioactive substance in minutes is

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125. 5 mol of $Fe_2(C_2O_4)$ is oxidised by $xmol$ of $K_2Cr_2O_7$ in acidic medium, calculate the value of x?

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126. The angular momentum of an electron in He^+ moving in an orbit is h/π. The debrogile wavelength associated with electron is : [a_0 is radius of first bohr's orbit of H - atom]

A. $2\pi a_0$

B. πa_0

C. $4\pi a_0$

D. $\frac{\pi a_0}{2}$

Answer: A

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127. For the reaction

$2HI(g) \Leftrightarrow H_2(g) + I_2(g)$. The value of K_c is 4. If 2 moles of H_2, 2 moles of I_2 and 2 moles of HI are present in one litre container then moles of I_2 present at equilibrium is :

A. 0.8

B. 3.2

C. 2.4

D. 4.4

Answer: C

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128. At what temperature would N_2 molecules have same average speed as CO molecules at 200 K.

A. $-73^\circ C$

B. $200^\circ C$

C. $700^\circ C$

D. none

Answer: A

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129. Which of the following ions have maximum hydration energy?

A. Sr^{+2}

B. Ca^{+2}

C. Mg^{+2}

D. Be^{+2}

Answer: D

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130. In the extraction of copper, the metal formed in the Bessemer converter is due to the reaction

A. $Cu_2S + 2Cu_2O \xrightarrow{\Delta} 6Cu + SO_2$

B. $Cu_2S + 2Cu + S$

C. $Fe + Cu_2O \rightarrow 2Cu + FeO$

D. $2Cu_2O \rightarrow 4Cu + O_2$

Answer: A

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131. K_2HgI_4 is 55% ionized in aqueous solution. The value of Van't Hoff factor is

A. 2.1

B. 4.3

C. 1.9

D. 3.7

Answer: A

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132. The radius ratio of KF is 0.98. The structure of KF is of the type

A. $NaCl$

B. ZnS

C. $CsCl$

D. CaF_2

Answer: C

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133. Combustion of hydrogen in a fuel cell at 300 K is represented as $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$. If ΔH and ΔG are $-241.60 kJmol^{-1}$ and $-228.40 kJmol^{-1}$ of H_2O. The value of ΔS for the above process is

A. $+44.\mathrm{JK}^{-1}\ \mathrm{mol}^{-1}$

B. $-88\ \mathrm{JK}^{-1}\ \mathrm{mol}^{-1}$

C. $+88\ \mathrm{JK}^{-1}\ \mathrm{mol}^{-1}$

D. $-44.7\ \mathrm{JK}^{-1}\ \ \mathrm{mol}^{-1}$

Answer: D

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134. A current strength of 0.965 amperes is passed through excess fused $AlCl_3$ for 5 hours. How many litres of chlorine will be liberated at STP ? $(F = 96500C)$

A. 2.016

B. 1.008

C. 11.2

D. 20.16

Answer: D

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135. The correct Lewis acid order for boron halides is

A. $BBr_3 > BCl_3 > Bl_3 > BF_3$

B. $BI_3 > BF_3 > BBr_3 > BCl_3$

C. $BF_3 > BCl_3 > BBr_3 > Bl_3$

D. $BI_3 > BBr_3 > BCl_3 > BF_3$

Answer: D

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136. Incorrect match among the following is :

A. Vitamin $B_{12} - Cu$

B. Cis - platin - Pt

C. Wilkinson catalyst - Rh

D. Chlorophyll - Mg

Answer: A

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137. Incorrect statement among the following is :

A. Oxidation state of chromium in chromate and dichomate is same

B. Oxidation of manganese is different in manganate and permanganate

C. Colour of chromate and dichromate is orange

D. Chromate ion gets converted into dichromate ion in acidic medium

Answer: C

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138. The pair of compounds which have different hybridisation but same shape

A. SO_3, ClF_3

B. BF_3, PCl_3

C. XeF_2, CO_2

D. XeF_4, SF_4

Answer: C

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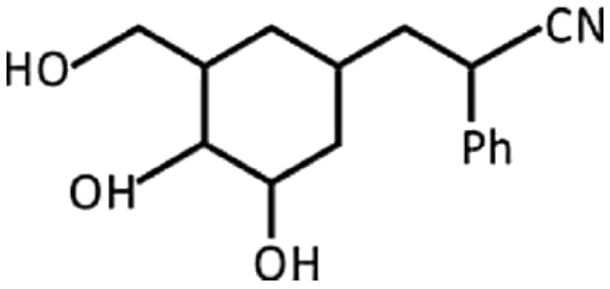

139.

What is the IUPAC name of given compound ?

A. 3-(3, 4- dihydroxy - 5 hydroxymethylcyclohexyl)-2- phenylpropane nitrile

B. 3-(4, 5- dihydroxy -2 hydroxymethylcyclohexyl) -2- phenylpropane nitrile

C. 5-(2-cyano -2-phenyl)ethyl-3-hydroxylmethylcyclohexane - 1,2 diol

D. 4 - (2- cyano -2- phenyl) ethyl - 6- hydroxylmethylcyclohexane1,2 diol

Answer: A

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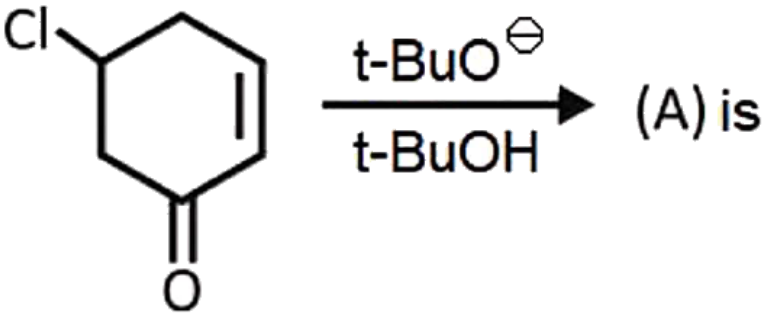
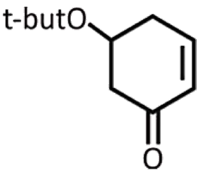
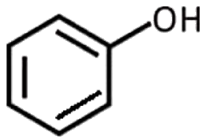
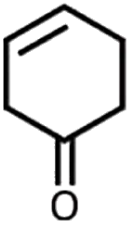
140. Find the final product of the reaction

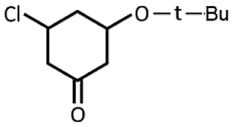


A.



B. 

C. 

D. 

Answer: B

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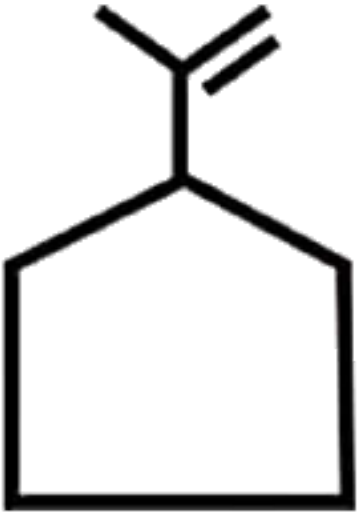

141.

$$\xrightarrow{\text{(i) } O_3\,(2)\,Zn\,|\,H_2O} (A) + (B) \xrightarrow{\text{Cannizzaro Reaction}} (C) + (D) \quad (\text{alcohol})$$

Identify at the possible product

A. $H - \underset{\underset{O}{\|}}{C} - ONa$

B. $CH_3 - \underset{\underset{O}{\|}}{C} - OH$

C. $CH_3 - OH$

D. none of these

Answer: A::C

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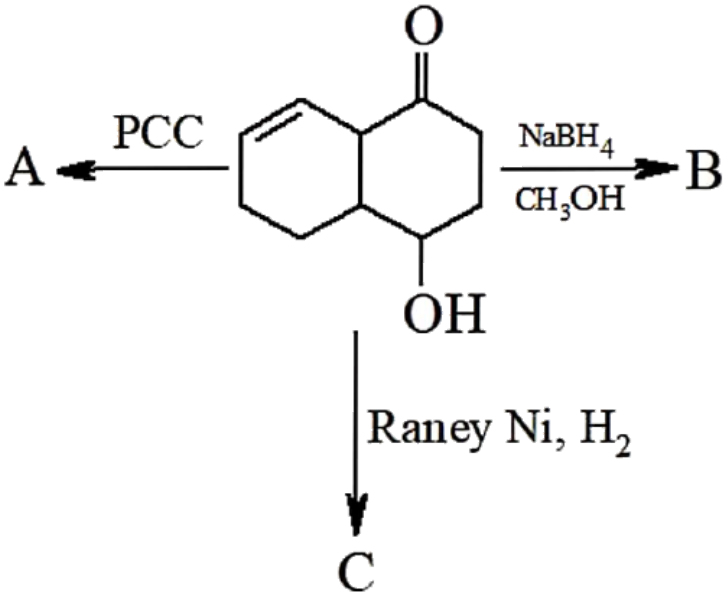
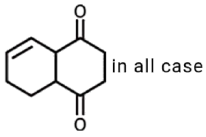
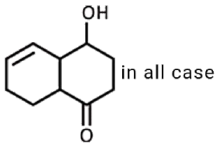
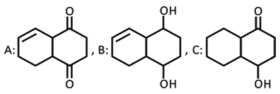
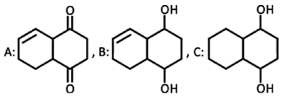
142. What are A, B and C in the following



A. 

B. 

C. 

D. 

Answer: D

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143. The strongest base amongst the following in (In aqueous state):

A. NH_3

B. $C_2H_5NH_2$

C. $(C_2H_5)_2N$

D. $(C_2H_5)_3N$

Answer: C

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144. Highest electron affinity is shown by

A. F^-

B. Cl^-

C. NA^+

D. Li^+

Answer: D

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145. A metal M forms the sulphate $M_2(SO_4)_3$. A 0.596 gram sample of the sulphate reacts with excess $BaCl_2$ to give 1.220 g $BaSO_4$. What is the atomic mass of M ?

A. 26.9

B. 69.7

C. 55.8

D. 23

Answer: A

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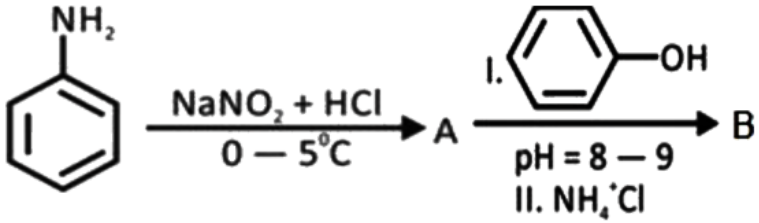

146.

If molar mass of compound B is x then find $\frac{x}{2}$

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147. Find the value of $\frac{x+5}{2}$ where x = total structural isomers with molecular formula C_6H_{12} containing cyclo propane ring.

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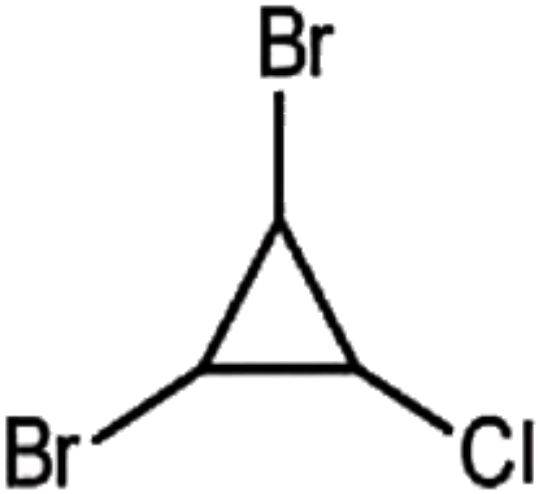
148. Number of stereoisomers possible for the following compound is



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149. One litre of 1 M solution of an acid $HA\left(K_a = 10^{-4} \text{ at } 25^\circ C\right)$ has pH = 2. It is diluted by water so the new pH becomes double. The solution was diluted to $y \times 10^z ml$. The value of $\frac{y+z}{2}$ is :

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150. Total number of elements which do not form hydrides are Mo, Ca, Fe, Pd, Co, Ru, W, Cr

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151. What is the correct order of electronegativity?

A. $M^{1-} < M^{2-} < M^{3-} < M^{4-}$

B. $M^{1-} > M^{2-} > M^{3-} > M^{4-}$

C. $M^{1-} > M^{2-} < M^{3-} > M^{4-}$

D. $M^{4-} < M^{2-} < M^{3-} < M^{1-}$

Answer: B

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152. The sum of $p\pi - d\pi$ bonds in the gases obtained by strong heating of ferrous sulphate is :

A. 1

B. 2

C. 3

D. 4

Answer: C

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153. Least stable peroxide among the following :

A. MgO_2

B. CaO_2

C. SrO_2

D. BaO_2

Answer: A

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154. $Cl_2(g) + Ba(OH)_2 \rightarrow X(aq.) + BaCl_2 + H_2O$

$X + H_2SO_4 \rightarrow Y + BaSO_4$

$Y \xrightarrow[T>365K]{\Delta} Z + H_2O + O_2$

Y and Z are respectively:

A. $HClO_4, ClO_2$

B. $HClO_3, ClO_2$

C. $HClO_3, ClO_6$

D. $HClO_4, Cl_2O_7$

Answer: B

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155. Which compound is deliquescent-

A. $ZnCl_2$

B. Hg_2Cl_2

C. $HgCl_2$

D. $CdCl_2$

Answer: A

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156. Number of metal oxygen bonds in the orange - red coloured compound formed when $NaCl$ reacts with $K_2Cr_2O_7$ and H_2SO_4.

A. 2

B. 4

C. 6

D. 0

Answer: B

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157. Gold is leached using CN^- solution followed by reduction with Zn. What is the co - ordination numberof Zn in the final product ?

A. 2

B. 6

C. 5

D. 4

Answer: D

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158. Which of the following complex has th highest value of Δ_t.

A. $[CoCl_4]^{2-}$

B. $[CoBr_4]^{2-}$

C. $[CoI_4]^{2-}$

D. $\left[Co(NCS)_4\right]^{2-}$

Answer: D

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159. Which is correct relationship between K_p and K_c for following reversible reaction at 10 K temperature ? K_p and K_c in untis of atm and M respectively

$A_2(g) + 3B_2(g) \Leftrightarrow 2AB_3(g)$

A. $K_p > K_c$

B. $K_p < K_c$

C. $K_p = K_c$

D. Relation cannot be predicted

Answer: A

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160. Two substances $A\left(T_{\frac{1}{2}}=10\ \ \min\right) \& B\left(T_{\frac{1}{2}}=20\ \min\right)$ follow I order kinetics in such a way that $[A]_i=8[B]_j$. Time when $[B]=2[A]$ in min is :

A. 20

B. 40

C. 60

D. 80

Answer: D

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161. A current of 1.93 ampere is passed through 200 mL of 0.5 M Zinc sulphate (aq.) solution for 50 min with a current efficiency of $80\ \%$. If volume of solutuion remain constant, then $\left[Zn^{2+}\right]$ after deposition of Zn^{2+} is :

A. 0.38 M

B. 0.26 M

C. 0.35 M

D. 0.076 M

Answer: A

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162. pH of 0.1 M aqueous solution of weak monoprotic acid HA is 2. Calculate osmotic pressure of this solution at $27^{\circ}C$. Take solution constant $R = 0.082\,\mathrm{L\,atm/K\text{-}mol}$

A. 2.46 atm

B. 3.5 atm

C. 3.05 atm

D. 2.7 atm

Answer: D

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163. A_2B has antifluorite structure (B forms FCC lattice and A occupies tetrahedral voids).If all ions along any one body diagonal are removed, then new formula of compound will be :

A. A_4B_5

B. A_8B_5

C. A_7B_6

D. A_8B_4

Answer: B

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164. Combustion of glucose takes place according to the equation

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O, \Delta H = -72\,\text{kcal/mol}.$

How much energy will be released by the combustion of 1.6 g of glucose (Molecular mass of glucose = 180 g/mol)?

A. 0.064 kcal

B. 0.64 kcal

C. 6.4 kcal

D. 64 kcal

Answer: B

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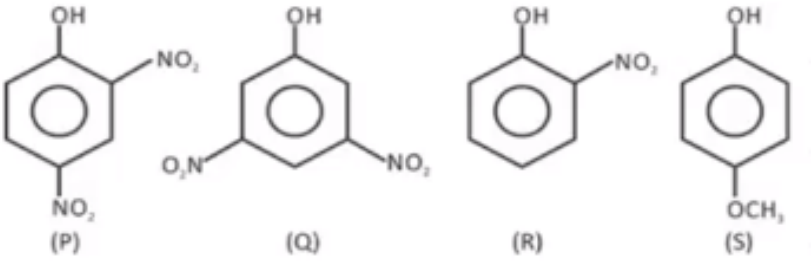
165. Find correct order of acidic strength in the following?



A. $P > Q > R > S$

B. $P > R > Q > S$

C. $R > P > Q > S$

D. $R > Q > P > S$

Answer: B

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166. The olefin which on ozonolysis gives CH_3CH_2CHO and CH_3CHO is

A. But -1 - ene

B. But -2- ene

C. Pent -1- ene

D. Pent -2-ene

Answer: D

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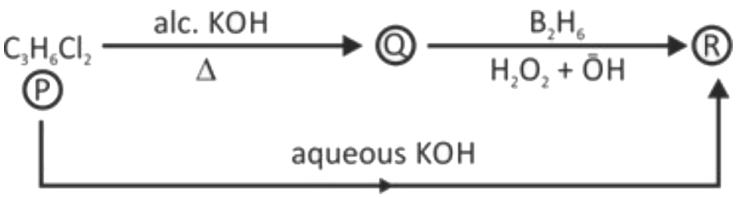
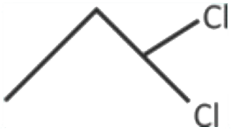
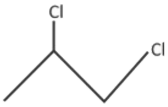


167.

Compound P will be

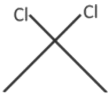


A.



B.

C.



D.

Answer: A

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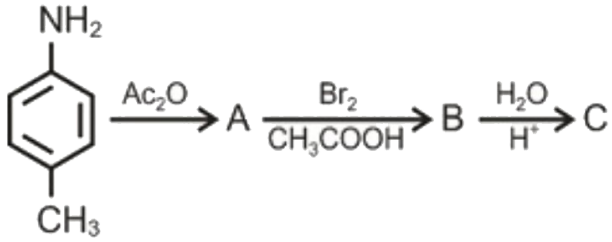
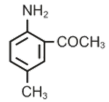
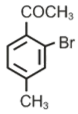
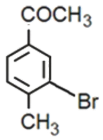
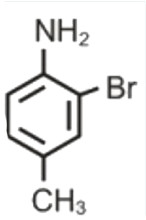
168. The final product C, obtained in this reaction would be



A. 

B. 

C. 

D. 

Answer: D

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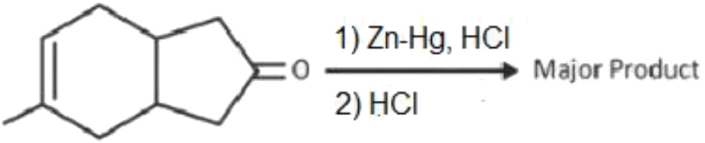
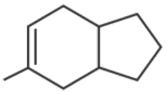
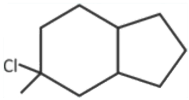
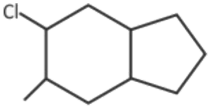
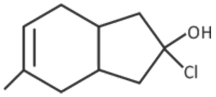
169. Complete the following reaction



A. 

B. 

C. 

D. 

Answer: B

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170. Which of the following compounds is used in anti - knock compositions to prevent the deposition of oxides of lead on spark plug, combustion chamber and exhaust pipe?

A. Benzene

B. Glycol

C. 1, 2-Dibromoethane

D. Glycerol

Answer: C

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171. At $STP 5.6 \text{litre}$ of a gas weigh $60g$. The vapour density of gas is:

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172. The total number of moles of neutrons present in 108 mL $H_2O(l)$ are

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173. Number of electrons having $l + m = 0$ in $Mn(z = 25)$ is

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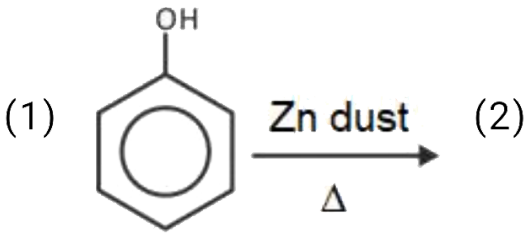
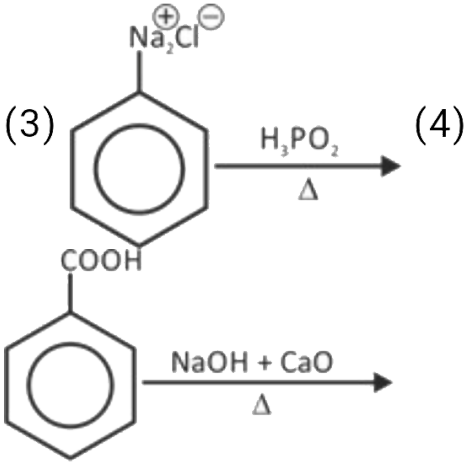
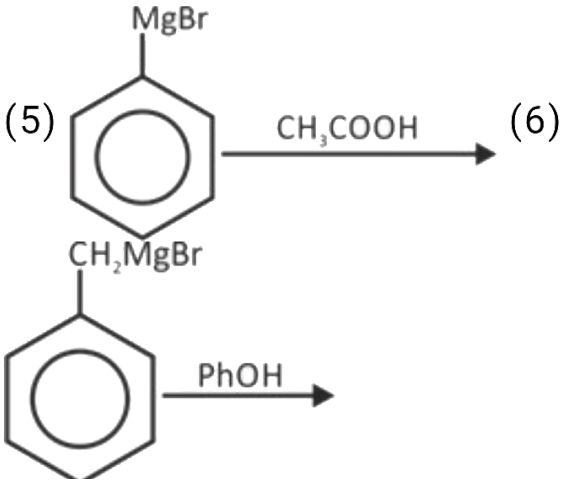
174. Identify number of reactions that can give benzene as major product



$$CH \equiv CH \xrightarrow{\text{Red Hot Fe}}$$





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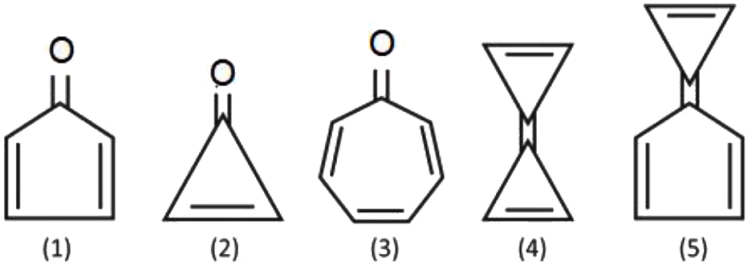
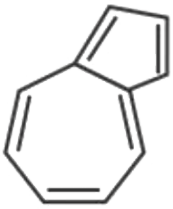
175. Find out total number of compounds which are more stable in its ionic form





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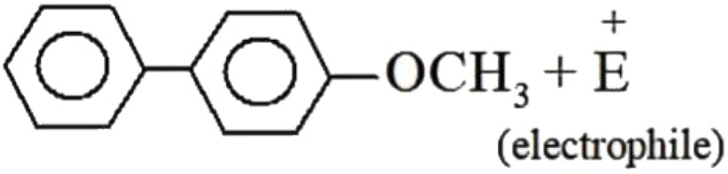
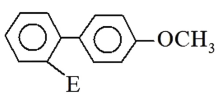
Chemistry Single Choice

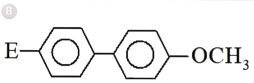
1. The major product formed in the reaction is:



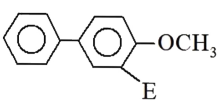
A.



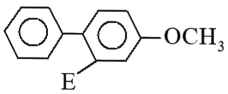
B.



C.



D.



Answer: C

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2. Enumerate the reactions of D-Glucose which cannot be explained by its open-chain structure.

A. (I)

B. (II)

C. (III)

D. All of above

Answer: D

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3. Ethylene dibromide on heating with metallic sodium in ether yields.

A. ethane

B. ethyene

C. 2-butene

D. 1 - butene

Answer: C

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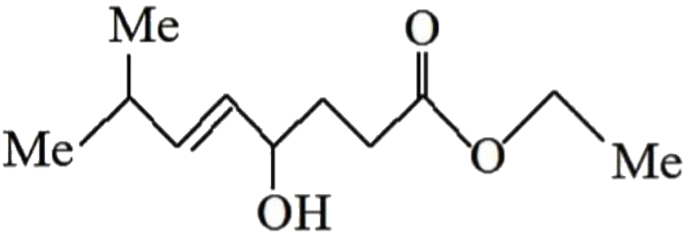
4. Write the IUPAC names of the following structures?



A. Ethyle-2-hydroxy-6-methyloct-5-en-1-oate

B. Ethyle-2-hydroxy-7-methyloct-4-en-1-oate

C. Ethyle-1-hydroxy-7-methyloct-5-en-1-oate

D. Ethyle-2-hydroxy-7-methyloct-5-en-1-oate

Answer: D

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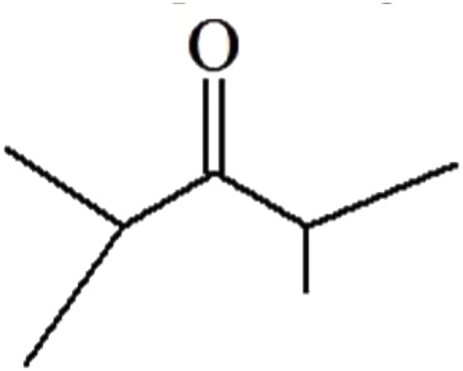
5. Number of Deuterium exchange in the given tautomer when the compound is kept in $NaOD/D_2O$ for a long time is :



A. 2

B. 4

C. 6

D. 8

Answer: A

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6. Match the reactions given in column(I) with process/products in column (II) and select the proper code of choice from the choices given at the end.

(I)		(II)
(A) $NaCl(aq) \longrightarrow Na^+ + Cl^-$ $Na^+ + e^- \longrightarrow Na(s)$ $2Cl^- \longrightarrow Cl_2(g) + 2e^-$	p)	Castner Kellner Cell
(B) $NaCl_{(aq)} \longrightarrow Na^+_{aq} + Cl^-_{aq}$ $Na^+ + e^- \xrightarrow{Hg} Na - Hg$ $2Cl^- \longrightarrow Cl_2 + 2e^-$ $Na - Hg + H_2O \longrightarrow NaOH + Hg + \frac{1}{2}H_2$	q)	Bleaching Powder
(C) $2Ca(OH)_2 + 2Cl_2 \longrightarrow CaCl_2 + Ca(OCl)_2 + 2H_2O$ (Slaked lime)	r)	Solvay's Process
(D) $NaCl + NH_3 + CO_2 + H_2O \longrightarrow NaHCO_3 + NH_4Cl$ $2NaHCO_3 \longrightarrow Na_2CO_3 + H_2O + CO_2$	s)	Down's Cell

A. $A \to (s), B \to (p), C \to (q), D \to (r)$

B. $A \to (r), B \to (p), C \to (s), D \to (q)$

C. $A \to (p), B \to (s), C \to (r), D \to (q)$

D. $A \to (r), B \to (q), C \to (p), D \to (s)$

Answer: A

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7. How many unit cells are present in 39 g of potassium that crystallises in body-centred cubic structure ?

A. $\frac{N}{4}$

B. $\frac{N}{2}$

C. $\frac{N}{3}$

D. N

Answer: B

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8. Nickel (Z=28) combines with a uninegative monodenatate ligands to form a diamagnetic complex $[NiL_4]^{2-}$. The hybridisation involved and the number of unpaired electrons present in the complex are respectively:

A. dsp^2 , zero

B. sp^3, zero

C. dsp^2, .one

D. sp^3, two

Answer: A

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9. 1 mole of equimolar mixture of $Fe_2(C_2O_4)_3$ and FeC_2O_4 required X moles of $KMnO_4$ in acid medium for complete reaction. The value of X is:

A. 0.9

B. 0.6

C. 1.2

D. 0.8

Answer: A

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10. CN^- solution used in extraction of which metal?

A. Ag

B. Ti

C. Zn

D. Sn

Answer: A

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11. In a first order reaction, the concentration of the reactant, decreases from 0.8 M to 0.4 M in 15 minutes. The time taken for the concentration to change form 0.1 M to 0.025 M is :

A. 30 minutes

B. 15 minutes

C. 7.5 minutes

D. 60 minutes

Answer: A

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12. The atomic numbers of vandium (V). Chromium (Cr), manganese (Mn) and iron (Fe) respectively 23, 24,25 and 26. Which one of these may be expected to have the higher second ionization enthalpy ?

A. Mn

B. V

C. Cr

D. Fe

Answer: C

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13. Which type of sillcate compound, Beryl $(Be_3Al_2Si_6O_{18})$ is?

A. Chain silicate

B. Cyclic sillicate

C. Planar silicate

D. Disilicate

Answer: B

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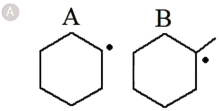
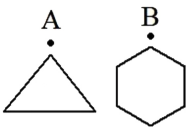
14. In which of the following pairs A is more stable than B?

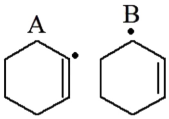
A.



B.



C.



D.

A	B
$Ph_3C^{\cdot}$	$(CH_3)_3C^{\cdot}$

Answer: D

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15. In which of the following reactions, the product(s) given is/are not correct?

A. $3Cu + 8HNO_3(dil) \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

B. $3Zn + 8HNO_3(\text{very dil}) \rightarrow 3Zn(NO_3)_2 + 2NO + 4H_2O$

C. $4Sn + 10HNO_3(dil) \rightarrow 4SN(NO_3)_2 + NH_4NO_3 + 3H_2O$

D. $As + 3HNO_3(dil) \rightarrow H_3AsO_3 + 3NO_2$

Answer: B

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16. The energy of second Bohr orbit of the hydrogen atom is $-328kJmol^{-1}$, hence the energy of fourth Bohr orbit would be.

A. $-41kJmol^{-1}$

B. $-82kJmol^{-1}$

C. $-164kJmol^{-1}$

D. $-1312kJmol^{-1}$

Answer: B

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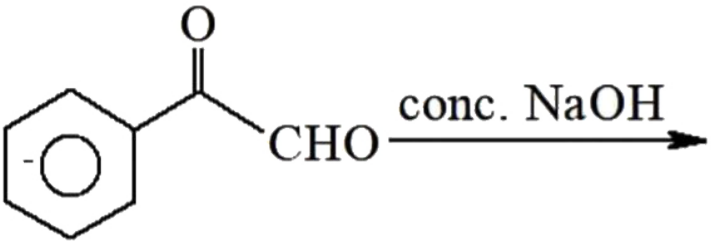
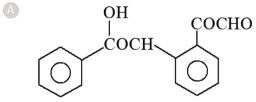
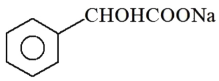
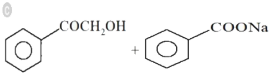


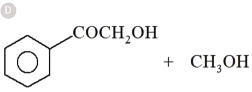
17.

Product should be

A. 

B. 

C. 

D. 

Answer: B

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18. In XeF_2, XeF_4 and $XeF_6(g)$ the number of lone pairs on Xe respectively are :

A. 2,3,1

B. 1,2,3

C. 4,2,1

D. 3,2,1

Answer: D

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19. The rates of diffusion of gases A and B of molecular weight 36and 64 are in the ratio

A. $9:16$

B. $4:3$

C. $3:4$

D. $16:9$

Answer: B

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20. One of the reaction that takes place in producing steel from iron ore is the reduction of iron(II) oxide by carbon monoxide to give iron metal and CO_2.

$FeO(s) + CO(g) \Leftrightarrow Fe(s) + CO_2(g)$, $K_p = 0.265$ atm at $1050K$

What are the equilibrium partial pressure of CO and CO_2 at $1050K$ if the partical pressure are: $p_{CO} = 1.4atm$ and $p_{CO_2} = 0.80atm$?

A. $[P_{CO}]$ = 1.739 atm and P_{CO_2} = 0.461 atm

B. $[P_{CO}]$ = 17.39 atm and P_{CO_2} = 0.461 atm

C. $[P_{CO}]$ = 1.79 atm and P_{CO_2} = 0.46 atm

D. $[P_{CO}]$ = 2.739 atm and P_{CO_2} = 0.461 atm

Answer: A

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Chemistry Subjective Numerical

1. For the electrochemical cell,

$Mg(s)\left|Mg^{2+}(aq.\ 1M)\right|\left|Cu^{2+}(aq.\ 1M)\right|Cu(s)$

the standard emf of the cell is 2.70 V at 300 K. When the concentration of Mg^{2+} is chaged to x M, the cell potential changes to 2.67 V at 300 K. The value of x is _____ .

(Given $\frac{F}{R} = 11500kV^{-1}$. where F is the Faraday constant and R is the gas constant, ln (10) = 2.30)

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2. Among the compounds , Benzene, Carbon tetrachloride, Naphthalene, Benzoic acid, Isooctane and Anthracene, how many can be purified by sublimation.

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3. Number of incorrect statement are-

(A) The π bond between metal and carbonyl carbon reduces the bond order of C-O in carbon monoxide.

(B) dz^2 orbital of central metal atom/ion is used in dsp^2 hybridisation.

(C) CN^- is a π_ acid Ligand.

(D) All negative ligands are stronger than neutral ligends.

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4. How many of the following pollutants are considered as non-viable particulate pollutants? Smoke, dust, fungi, mists, moulds , algae, smog, bacteria, fumes.

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5. Total number of electrophiles present in the following are

$NO_2^+, SO_3, CN^-, F^-, CCl_4, NH_3, , :CCl_2.$

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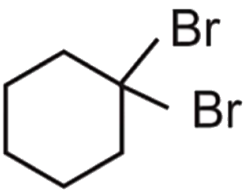
Mcqs Chemistry

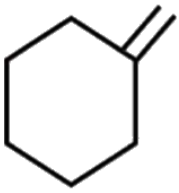
1. Which reaction produce 1-methylcyclohexene

A.



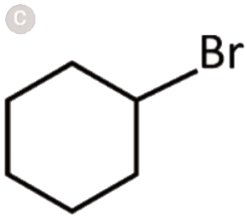
$$\xrightarrow[(ii)\,CH_3MgBr, \text{ether}, (iii)\,H^+, H_2O]{(i)\,aq.KOH}$$

B.



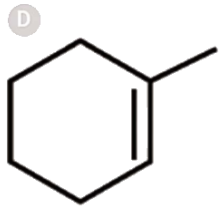
$$\xrightarrow[(ii)\,\text{alcoholic}\ \ KOH\,.\,\Delta]{(i)\,HBr}$$

C.



$$\xrightarrow[(ii)\,CH_2O,\,(iii)\,H^+,H_2O]{(i)\,Mg,\text{ether}}$$

D.



$$\xrightarrow[(ii)\,aq.NaOH]{(i)\,HI}$$

Answer: B

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2. $[NiCl_4]^{2-}$, $[PtCl_4]^{2-}$ and $[PdCl_4]^{2-}$ are respectively:-

A. high spin, low spin, high spin

B. low spin, low spin, low spin

C. high spin, low spin, low spin

D. low spin, high spin, high spin

Answer: C

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3. Glucose does not react with

A. pure HCN

B. Schiff's reagent

C. $NaHSO_3$

D. all of these

Answer: D

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4. Potassium ozonide on decomposition gives

A. $K + O_2$

B. $K_2O + O_2$

C. $KO_2 + O_2$

D. $KO_2 + O_3$

Answer: C

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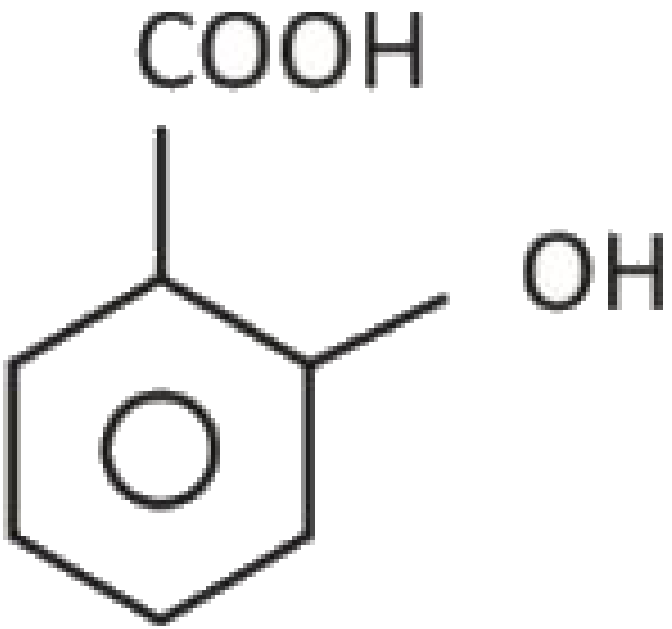
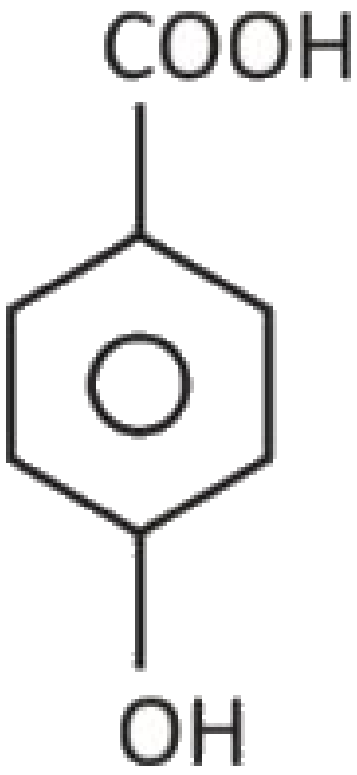
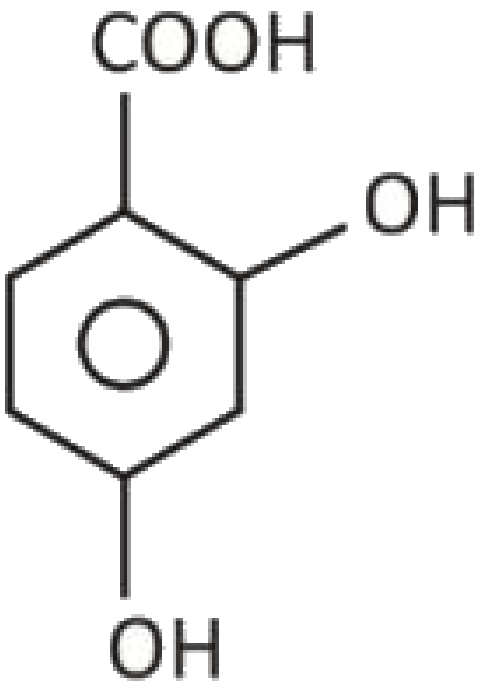
5. The order of ka values of the following acids is:



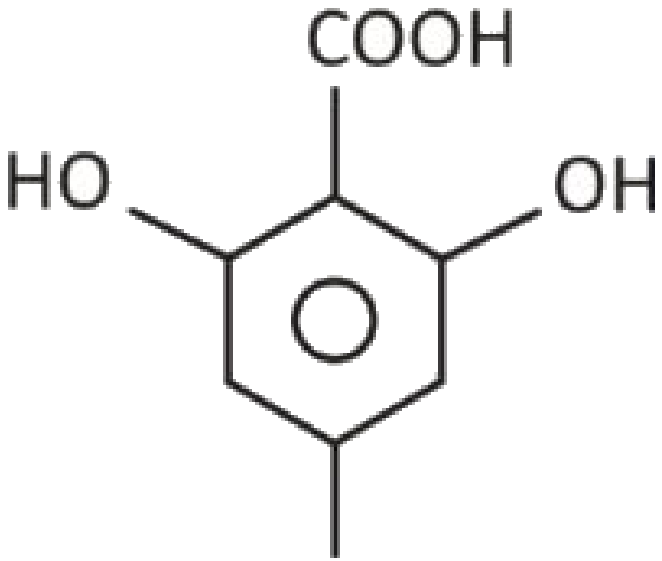
(i)



(ii)



(iii)



(iv)

A. $(i) > (iv) > (iii) > (iv)$

B. $(iv) > (i) > (iii) > (ii)$

C. $(iii) > (iv) > (i) > (ii)$

D. $(iv) > (i) > (ii) > (iii)$

Answer: B

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6. K_{sp} of $Al(OH)_3 = 10^{-36}$

and $E^{\circ}_{Al^{3+}/Al} = -1.66V$

Reduction potential of Al^{3+}/Al couple at $pH = 12$ and 298K is

A. 1.07V

B. 2.25V

C. $-1.07V$

D. $-2.25V$

Answer: D

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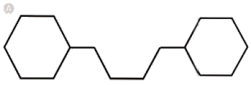
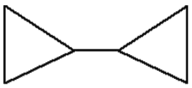
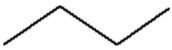
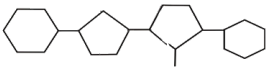
7. The hydrocarbon that connot be prepared effictively by Wurtz reaction is

A. 

B. 

C. 

D. 

Answer: D

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8. What is the $[OH^-]$ concentration of a 0.04 M solution of CH_3COONa?

$[K_a \text{ of } CH_3COOH = 2 \times 10^{-5}, \log 2 = 20]$

A. 5×10^{-6}

B. 6×10^{-6}

C. 2×10^{-9}

D. 3×10^{-9}

Answer: A

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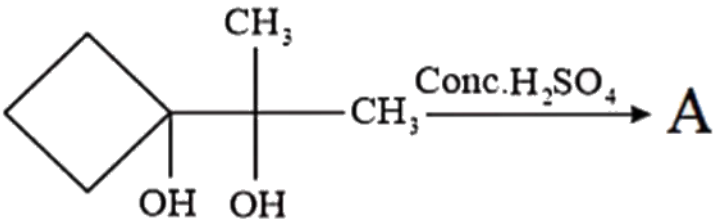
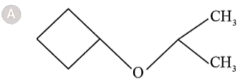
9. The product A is



A.



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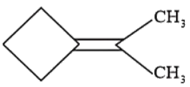

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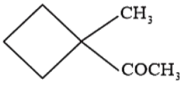
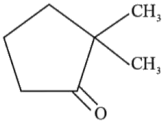


D.



Answer: D

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10. The following conversion can be obtained by using $\underset{(\text{excess})}{NH_3} \xrightarrow{?} N_2H_4$

A. OCl^-

B. HSO_3^-

C. HCO_3^-

D. PO_4^{-3}

Answer: A

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11. White bauxite is leached by

A. Hall's process

B. Serpeck's process

C. Bayer's process

D. All of these

Answer: B

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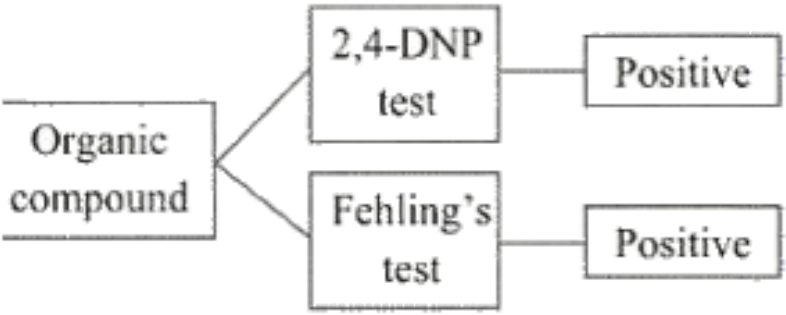

12.

How many amont the following compound will give the above result?

I. Cyclohexanone

ii. Acetone

iii. Propionaldehyde.

iv. Acetophenone.

v. Acetaldehyde

vi. Benzophenone

vii. Benzaldehyde.

A. 2

B. 3

C. 4

D. 5

Answer: A

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13. Strontium crystallizes in a fcc unit cell with edge length a. it contains 0.2% Frenkel defect and another crystal of Sr contains 0.1% Schottky defect. Density of solid with Frenkel defect=d_f and density with Schottky defect=d_S, then

A. $d_f = d_S$

B. $d_f > d_S$

C. $d_f < d_S$

D. $d_f = 2d_S$

Answer: B

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14. Which hydrogen -like species will have the same r adius as that of Bohr orbit of hydrogen atom ?

A. $n = 2, Be^{3+}$

B. $n = 2, Li^{2+}$

C. $n = 2, He^{+}$

D. $n = 3, Li^{2+}$

Answer: A

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15. Compound found by hydrolysis of $BiCl_3$ is:-

A. Bismuth hydroxide

B. Bismuth oxychloride

C. Bismuth oxide

D. Oxo acid of bismuth

Answer: B

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16. Select which type of overlapping is responsible for π-character in $Si - N$ bond N_3SiNCO

A. $3p\pi \rightarrow 2p\pi$

B. $2p\pi \rightarrow 2p\pi$

C. $3d\pi \leftarrow 2p\pi$

D. $3d\pi \leftarrow 2d\pi$

Answer: C

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17. Which statement is incorrect with reference to inner transition elements?

A. The oxides of lanthanoids are basic

B. Pm is radioactive element among actinoids

C. The values of ionization enthalpy of actinoids are less than the values of ionization enthalpy of lanthanoids

D. Only in the electronic configuration of lanthanoids like Ce, Gd, Lu the electron are filled in 5d orbitals

Answer: B

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18. A reaction between A and B is represented as $A + B \rightarrow C$

Observations on the rate of this reaction are obtained as

S.No.	Initial concentration $(A)_0 M$	Initial concentration $(B)_0 M$	Initial rate of reaction Mhr^{-1}
1.	0.1	1.0	5.0×10^{-3}
2.	0.1	2.0	2.0×10^{-2}
3.	0.05	1.0	2.5×10^{-3}

Order of reaction will respect to A and B respectively are:-

A. 1,2

B. 1,1

C. 2,1

D. 2,2

Answer: A

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19. Which of the following option w.r.t. increasing bond order is correct ?

A. $C_2 < NO < He_2^+ < O_2^-$

B. $NO < C_2 < O_2^- < He_2^+$

C. $He_2^+ < O_2^- < NO < C_2$

D. $He_2^+ < O_2^- < C_2 < NO$

Answer: D

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20. Given, $CH_3COOH(aq) \rightarrow CH_3COO^-(aq) + H^+(aq)$

$\Delta H_{rxn}^{\circ} = 0.004 \text{ kcal } gm^{-1}$

Enthalpy change when 1 mole of $Ba(OH)_2$, a strong base, is completely neutralized by $CH_3COOH(aq)$ is (ΔH° of neutralization of strong acid with strong base is$=-13.7 \text{ kcal } mol^{-1}$)

A. $-27.46 kcal/$mol

B. $27.46 kcal$/mol

C. $-26.92 kcal$/mol

D. $-13.46 kcal$/mol

Answer: C

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21. Determine which of the following statements are true at very high pressure for a real gas:

(a) Compressibility factor is greater than 1.

(b) Compressibility factor varies linearly with pressure.

(c) Molar volume occupied by gas is more as compared to ideal gas at similar pressure and temperature.

(d) Gas is less compressible as compare to ideal gas.

(e) Compressibility factor is given by

$Z = 1 + \frac{Pb}{RT}$.

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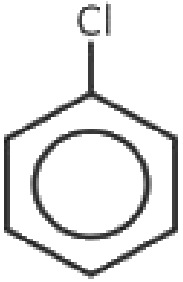
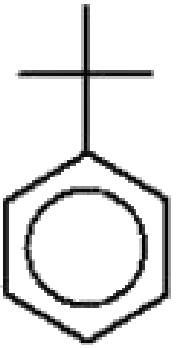
22. How many compounds having higher rate of electrophilic substitution than benzene

(1) 

(2) 

(3) 

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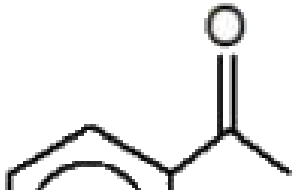
(5) 

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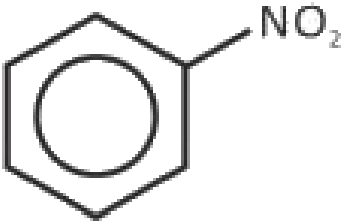

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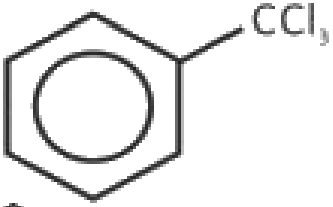

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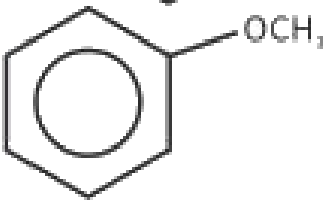

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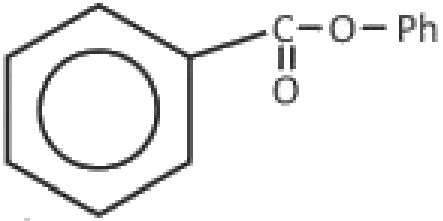

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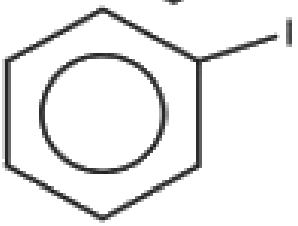

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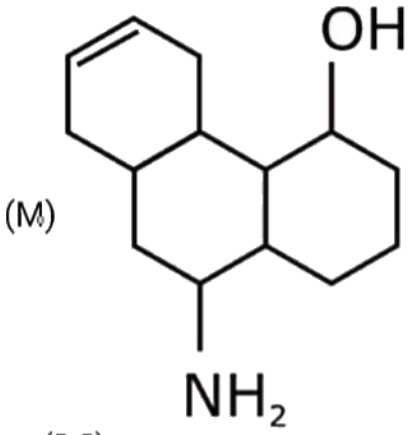
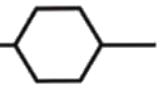
23. in (M)=x



(M) number of chiral carbon

in $(\mathrm{M}) = \mathrm{x}$

(N) $CH_3—CH=CH$  $CH=CH—CH_3$

(Number of Geometrial isomers in (N)=y). The value of $\frac{y}{x}$ is

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24. 0.002 molal aqueous solution of an ionic compound with molecular formula $Co(NH_3)_5(NO_2)Cl$ freezes at $-0.00744^\circ C$. How many moles of ions does 3 moles of the salt produce on being dissolved in water? [Given K_f of water=1.86 K kg mol^{-1}]

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25.

$M \rightarrow$ Possible alkynes Write the sum of value of $M + N$.

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