CHEMISTRY

BOOKS - AIIMS PREVIOUS YEAR PAPERS

AIIMS 2010

Chemistry

1. Butter is an example of which type of colloid?

A. Solid in liquid

B. Liquid in solid

C. Liquid in liquid

D. Gas in liquid.

Answer: C

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2. What are constituents of 'Mischmetal'?

A. La, Fe

B. La, Ce

C. Fe. Ce

D. Ce, Cu

Answer: B

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3. For a 1st order reaction if concentration is doubled then rate of reaction becomes

A. doubles

B. half

C. four times

D. remains same.

Answer: A

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4. In tetragonal crystal system, which of following

A. All axial lengths and all axial angles are equal.

B. All three axial tengths are equal.

C. All three axial angles are equal.

D. Two axial angies are equal, but the third is different.

Answer: C

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5. Which of the following is correct?

A. Ionicradius is proportional to atomic number.

B. Ionic radius is inversely proportional to atomic mass.

C. Ionic radius is inversly proportional to effective nucelar charge.

D. All are correct.

Answer: C

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6. The strained tetracyclic alkane is isomerize thermally to the cyclic alkene. The reaction involves

A. free radical

B. carbocation

C. carbanion

D. carbene.

Answer: A

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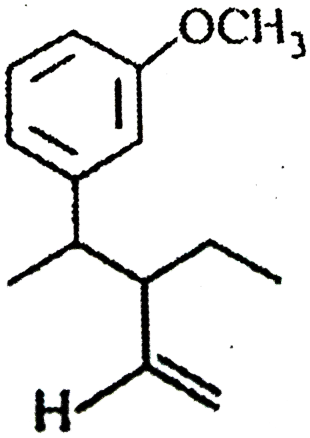
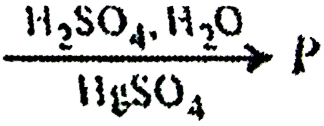
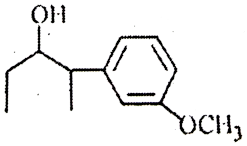
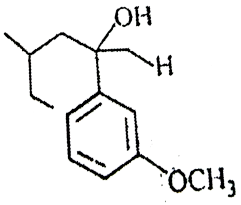
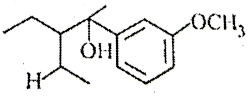
7. 



The product P is

A. 

B. 

C. 

D. none of these

Answer: C

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8. For a reaction $X \rightarrow Y$, the graph of the product concentration (x) versus time (t) came out to be a straight line passing through the origin. Hence and time would be the graph of $\frac{d[X]}{dt}$ and the time would be

A. straight line with a negative slope and an intercept on y-axis

B. straight linc with a positive slope and an intercept on y-axis

C. a straight line parallel to x-axis

D. a hyperbola.

Answer: C

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9. A factory produces 40 kg of calcium in two hours by electrolysis. How much aluminium can be produced by same current in 2 hours if current efficiency is 50%?

A. 22 kg

B. 18 kg

C. 9 kg

D. 27 kg

Answer: B

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10. Equal weight of CO and CH_4 are mixed together in an empty container at 300K. The fraction of total pressure exerted by CH_4 is

A. $\frac{16}{17}$

B. $\frac{7}{11}$

C. $\frac{8}{9}$

D. $\frac{5}{16}$

Answer: C

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11. Match list I with list II and select the correct answer using the codes given below the lists.

	List I Metal ion		List II Magnetic moment(BM)
A.	Cr^{3+}	1.	$\sqrt{35}$
B.	Fe^{2+}	2.	$\sqrt{30}$
C.	Ni^{2+}	3.	$\sqrt{24}$
D.	Mn^{2+}	4.	$\sqrt{15}$
		5.	$\sqrt{8}$

A. $A-1, B-3, C-5, D-4$

B. $A-2, B-3, C-5, D-1$

C. $A-4, B-3, C-5, D-1$

D. $A-4, B-5, C-3, D-1$

Answer: C

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12. Which of the following reactions does not yield an amine?

A. $R-X+NH_3 \rightarrow$

B. $R-CH=NOH+[H] \xrightarrow{Na/C_2H_5OH}$

C. $R-CN+H_2O \xrightarrow{H^+}$

D. $R-CONH_2 \xrightarrow{LiAlH_4}$

Answer: C

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13. The chemical name for melamine is

A. 1,3,5-Triamino-2,4,6-triazine

B. 2,4,6-Triamino-1,3,5-triazine

C. 2-Amino-1,3,5-triazine

D. 2.4-Diamino-1,3,5-triazine.

Answer: B

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14. Bromine is added to cold dilute aqueous solution of NaOH. The mixture is boiled. Which of the following statements is not true?

A. During the reaction bromine is present in four different oxidation states.

B. The greatest difference between the various oxidation states of bromine is S.

C. On acidification of the final mixture bromine is formed.

D. Disproportionation of bromine occurs during the reaction.

Answer: C

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15. A complex $PtCl_4.5NH_3$ shows a molar conductance of 402 $ohm^{-1}cm^2mol^{-1}$ in water and precipitate three mole of AgCl with $AgNO_3$. The formula of the complex is

A. $\left[Pt(NH_3)_6\right]Cl_4$

B. $\left[Pt(NH_3)_4Cl_2\right]Cl_2$

C. $\left[Pt(NH_3)_5Cl\right]Cl_3$

D. $\left[Pt(NH_3)_3Cl_3\right]Cl$

Answer: C

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16.

Electrolyte	$\wedge_{.}^{\infty}\left(Scm^2mol^{-1}\right)$
KCl	149.9
KNO_3	145.0
HCl	426.2
$NaOAc$	91.0
$NaCl$	126.5

Calculate $\wedge_{HOAc}^{\infty}$ using appropriate molar conductance of the electrolytes listed above at infinite dilution in H_2O at $25^{\circ}C$

A. 517. 2

B. 552.7

C. 390.7

D. 217.5

Answer: C

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17. In the ground state of Cu^+, the number of shells occupied, şubshells occupied, filled orbitals and unpaired electrons respectively are

A. 4, 8, 15, 0

B. 3, 6, 15, 1

C. 3, 6, 14, 0

D. 4, 7, 14, 2

Answer: C

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18. Which of the following conditions is not correct for resonating structures?

A. The contributing structures must have the same number of unpaired electrons.

B. The contributing structures slhould have similar energies.

C. The contributing structures should be so written that unlike charges reside on atoms that are far apart.

D. The positive charge should be present on the electropositive clement and the negative charge on the electronegative element.

Answer: C

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19. CaQ and NaCI have the same crystal structure and approximately the same ionic radii. If U is the lattice

energy of NaCl, the approximate lattice energy of CaO is

A. $U/2$

B. U

C. $2U$

D. $4U$

Answer: D

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20. The phosphate of a metal has the formula $MHPO_4$.

The formula of its chloride would be

A. MCl

B. MCl_2

C. MCl_3

D. M_2Cl_3

Answer: B

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21. Two flasks X and Y have capacity 1 L and 2 L respectively and each of them contains 1 mole of a gas. The temperature of the flasks are so adjusted that average speed of molecules in X is twice as those in Y. The pressure in flask X would be

A. same as that in Y

B. half of that in Y

C. twice of that in Y

D. 8 times of that in Y.

Answer: D

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22. Match List I with List II and select the correct answer using the codes given below the lists:

List I	List II
A. $\left(\frac{\delta G}{\delta P}\right)_T$	1. μ_{JT}
B. $\left(\frac{\delta G}{\delta T}\right)_P$	2. T
C. $\left(\frac{\delta H}{\delta S}\right)_P$	3. $-S$
D. $\left(\frac{\delta T}{\delta P}\right)_H$	4. P
	5. V

A.

	A	B	C	D
(a)	5	1	2	4

B.

	A	B	C	D
(b)	5	3	2	4

C.

	A	B	C	D
(c)	3	5	2	1

D.

	A	B	C	D
(d)	5	3	2	1

Answer: D

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23. What is the pH of $0.01M$ glycine solution? For glycine, $K_{a_1} = 4.5 \times 10^{-3}$ and $K_{a_2} = 1.7 \times 10^{-10}$ at $298K$

A. 3.0

B. 10.0

C. 7.06

D. 8.2

Answer: C

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24. Which of the following sequence contains atomic number of only representative elements?

A. 55,12, 48,53

B. 13,33,54,80

C. 3,33,53,87

D. 22,33,55,66.

Answer: C

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25. $100cm^3$ of a given sample of H_2O_2, gives $1000cm^3$ of O_2 at S.T.P. The given sample is

A. 10% H_2O_2

B. 90% H_2O_2

C. 10 volume H_2O_2

D. 100 volume H_2O_2

Answer: C

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26. Beryllium and aluminimum exhibit many properties which are similar . But, the two elements differ in

A. maximum covalency in compounds

B. exhibiting amphoteric nature in their oxides

C. forming covalent halides

D. forming polymeric hydrides

Answer: A

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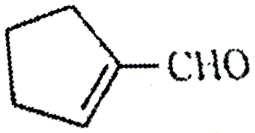
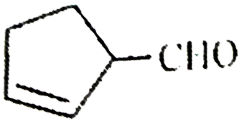
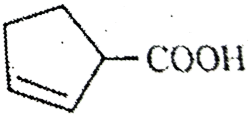
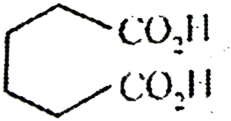
27. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on furhter treatment with aqueous KOH yields compound F. Compound F is

A. 

B. 

C. 

D. 

Answer: A

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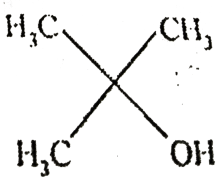
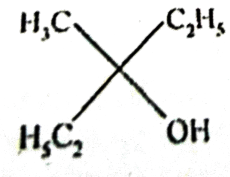
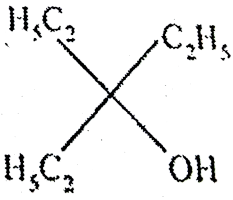
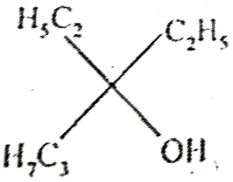
28. Ethyl easter $\xrightarrow[\text{excess}]{CH_3MgBr} P$, the product P is

A. 

B. 

C. 

D. 

Answer: A

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29. The compound which on reaction with cold nitrous acid gives oily nitrosoamine is

A. methyl amine

B. ethyl amine

C. diethyl amine

D. triethyl anine

Answer: C

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30. Compound A (molecular formula C_3H_8O)is treated with acidified potassium dichromate to form a product B (molecular formula C_3H_6O). B forms shining silver mirror on warming with ammoniacal silver nitrate. B when treated with an aqueous solution of

$H_2NCONHNH_2$, HCl and sodium acetate gives a product C. Identify the structure of C.

A. $CH_3CH_2CH = \mathbb{N}HCONH_2$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C} = \mathbb{N}HCONH_2$

C. $CH_3 - \underset{\underset{CH_3}{|}}{C} = NCONHNH_2$

D. $CH_3CH_2CH = NCONHNH_2$

Answer: A

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31. Assume that you are travelling at a speed of 90 km/h in a small car with a mass of 1050 kg. If the uncertainty

in the velocity of the car is 1% $\left(\Delta v = 0.9k\frac{m}{h}\right)$, what is the uncertainty (in meters) in the position of the car ?

A. $\Delta x \geq 1 \times 10^{-35} m$

B. $\Delta x \geq 2 \times 10^{-37}$ m

C. $\Delta x \geq 2 \times 10^{-36} m$

D. $\Delta x \geq 4 \times 10^{-38}$ m

Answer: B

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32. When 25 g of Na_2SO_4 is dissolved in 10^3 Kg of solution, its concentration will be

A. 2.5 ppm

B. 25 ppm

C. 250 ppm

D. 100 ppm

Answer: B

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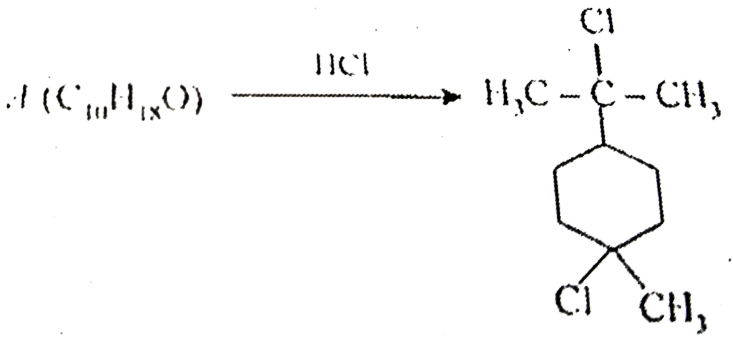
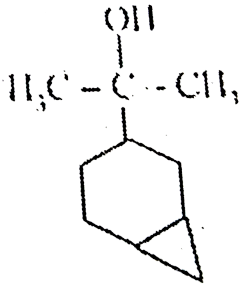
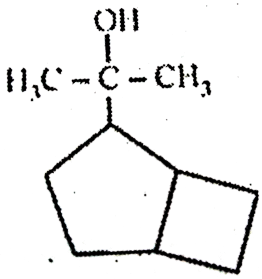
33. Degree of unsaturation of A = 2, it contains no double or triple bonds.



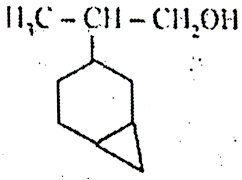
A.



B.



C.



D. none of these

Answer: A

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34. The shape and hybridisation of some xenon oxyfluorides are given. Choose the wrong set.

A. $XeOF_2$ - T- shapes sp^3d

B. $XeOF_4$ - Square pyramidal sp^3d^2

C. XeO_2F_2 - Distorted trigonal bipyramidal $-sp^3d$

D. XeO_3F_2 - Octahedral sp^3d

Answer: D

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35. The standard half-cell reduction potential for $Ag' \mid Ag$ is 0.7991 V at $25^{\circ}C$. Given the experimental value $K_{sp} = 1.56 \times 10^{m}$ for AgCl, calculate the standard half-cell reduction potential for the AglAgCI electrode.

A. $0.2192V$

B. $-0.2192V$

C. -1.2192 V

D. $1.2192V$

Answer: A

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36. Which of the following acids will not evolve H_2 gas on reaction with alkali metals?

A. hydrazoic acid

B. perxenic acid

C. boric acid

D. none of these

Answer: D

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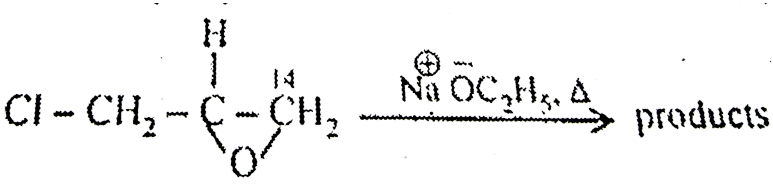
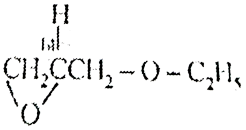
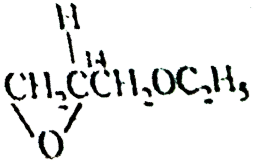
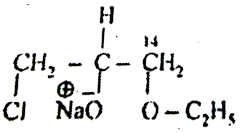
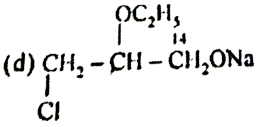
37. The major product of the following reaction is



A. 

B. 

C. 

D. 

Answer: B

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38. Stomach acid, a dilute solution of HCl in water, can be neutralized by reaction with sodium hydrogen carbonate.

$$NaHCO3_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(eq)} + H_2O_{(l)} + CO2_g$$

How many milliliters of 0.125 M $NaHCO_3$ solution are needed to neutralize 18.0 mL of 0.100 M HCl?

A. 14.4 mL

B. 12.0 mL

C. 14.0 mL

D. 13.2 mL

Answer: A

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39. For the electrochemical cell, $(M) \mid M^{+}) \mid \mid (X^{-} \mid X)$.

$E^{\circ}\left(M^{+}/M\right) = 0.44V$ and $E^{\circ}\left(X/X^{-}\right) = 0.33V$.

From this data one can deduce that

A. $M + X \rightarrow M^{+} + X^{-}$ is the sponthaneous reaction

B. $M^{+} + X^{-} \rightarrow M + X$ is the spontaneous reaction

C. $E_{\text{cell}} = 0.77V$

D. $E_{cell} = -0.77V$

Answer: B

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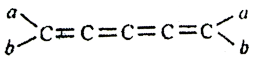
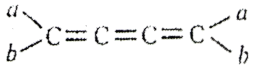
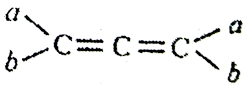
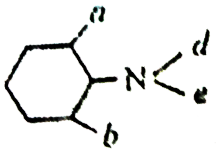
40. Which is optically inactive?

A. 

B. 

C. 

D. 

Answer: B

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41. Assertion : Magnesium is extracted by the electrolysis of fused mixture of $MgCl_2, NaCl$ and $CaCl_2$.

Reason: Calcium chloride acts as a reducing agent.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C

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42. Assertion (A) : The equilibrium constant is fixed and characteristic for any given chemical reaction at a specified temperature.

Reason (R) : The composition of the final equilibrium mixture at a particular temperature depends upon the starting amount of reactants.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B

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43. Assertion : PCl_5 is covalent in gaseous and liquid state but ionic in solid state.

Reason: PCl_5 in solid state consists of tetrahedral PCl_4^+ cation and octahedral PCl_6^- anion.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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44. Statement-1: Zinc displaces copper from copper sulphate solution.

Statement-2: The E°_{298} of Zn is -0.76 volts and that of Cu is +0.34 volts.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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45. Assertion : $CH - \underset{\underset{COOC_2H_5}{|}}{C} = CH - COOH$

-carbethoxy- 2-butenoic acid.

Reason: Principal functional group gets lowest number followed by double bond or triple bond.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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46. Assertion: Helium has the highest value of ionisation energy among all known elements.

Reason: Helium has the highest value of elelctron affinity among all known elements.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C

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47. Assertion : The nuclear isomers are the atoms with the same atomic number and same mass number, but with different radionctive properties.

Reason : The nucleus in the excited state will evidently have a different half-life as compared to that in the ground state.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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48. Assertion : Conductivity of silicon increases by doping it with group-15 elements.

Reason : Doping means introduction of small amount of impurities like P, As or Bi into the pure crystal.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B

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49. Assertion : The overall order of the reaction is the sum of the exponents of all the reactants in the rate

expression.

Reason: There are many higher order reactions.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C

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50. Assertion : Transition metals are poor reducing agents.

Reasons : Transition metals form numerous alloys with other metals.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B

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51. Assertion : Aldol condensation can be catalysed both by acids and bases.

Reason : β- hydroxy aldehydes or ketones readily undergo acid catalysed dehydration.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B

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52. (A) The position of an element in periodic table after emission of one α and two β-partilce remians unchanged.

(R) Emission of one α and two β particles gives isotope of the parent element which acquires same position in the periodic table.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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53. Assertion: S.I. unit of atomic mass and molecular mass is kilograms.

Reason : Atomic mass is equal to the mass of 6.023×10^{24} atoms.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: D

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54. Assertion : Bond energy and bond dissociation energy have identical value for diatomic molecules.

Reason : Greater the bond dissociation energy, less reactive is the bond.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B

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55. Assertion : The degree of complex formation in actinides decreases in the order

: Actinides form complexes with T-bonding ligands such as alkyl phosphines and thioethers.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B

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56. Statement-I : Benzene on heating with conc. H_2SO_4 gives benzene sulphonic acid which when heated with superheated steam under pressure gives benzene.

Because

Statement-II : Sulphonation is a reversible process.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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57. Assertion : The molality of the solution does not change with change in tempc- nature.

: The molality is expressed in units of moles per 1000 g of solvent. Reason

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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58. Assertion : Due to Frenkel defect, density of the crystalline solid decreases.

Reason : In Frenkel defect, cation or anion leaves the crystal.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: D

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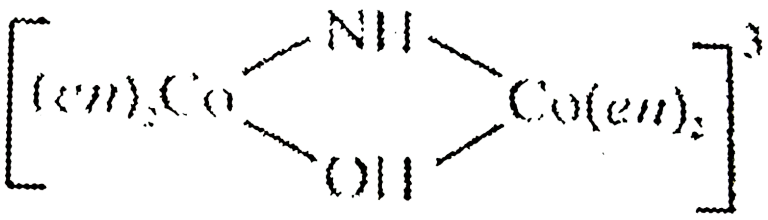
59. Assertion :



is named as tetrakis (ethylene- diammine)

$\mu-$ hydroxo $-\mu-$ imido dicobalt (III) ion.

Reason : In naming polynuclear complexes i.e., containing two or more metal atoms joined by bridging ligands, the word μ is added with hyphen before the nane of such ligands.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A

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60. Assertion : 2,3-Dimethylbut-2-ene is more stable than but-2-ene.

Reason : Six hyperconjugation structures can be written for 2, 3-dimethylbut-2- ene while but-2-ene has twelve.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C