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Answer & Solutions

for

NEET 2022

Chemistry

51. Which of the following statement is **not** correct about diborane ?

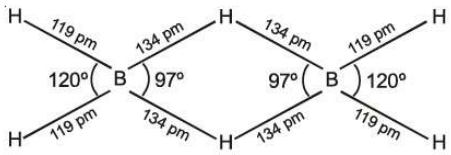
(1) The four terminal Hydrogen atoms and the two Boron atoms lie in one plane.

(2) Both the Boron atoms are sp^2 hybridised.

(3) There are two 3-centre-2-electron bonds.

(4) The four terminal B-H bonds are two centre two electron bonds.

Sol. Answer (2)



In diborane both the boran atoms are sp^3 hybridized.

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

Assertion (A): ICl is more reactive than I_2.

Reason (R): ICl bond is weaker than I-I bond.

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

(1) **(A)** is correct but **(R)** is not correct.

(2) **(A)** is not correct but **(R)** is correct.

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

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

Sol. Answer (3)

I_2 forms covalent bond which is more stronger than inter-halogen compound and weak bonds are obviously more reactive than stronger bond $\therefore$ ICl is more reactive than I_2 as I_2 forms stronger bond than ICl.

53. In one molal solution that contains 0.5 mole of a solute, there is

(1) 100 mL of solvent

(2) 1000 g of solvent

(3) 500 mL of solvent

(4) 500 g of solvent

Sol. Answer (4)

$$m = n_B \times \frac{1000}{w_A}$$

$$1 = 0.5 \times \frac{1000}{w_A}$$

$$\therefore w_A = 500\,g$$

54. Given below are half-cell reactions :

$$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$$

$$E^\circ_{Mn^{2+}/MnO_4^-} = -1.510\,V$$

$$\frac{1}{2}O_2 + 2H^+ + 2e^- \rightarrow H_2O\,,$$

$$E^\circ_{O_2/H_2O} = +1.223\,V$$

Will the permanganate ion, MnO_4^- liberate O_2 from water in the presence of an acid?

(1) Yes, because E°_{cell} = + 2.733 V

(2) No, because E°_{cell} = – 2.733 V

(3) Yes, because E°_{cell} = + 0.287 V

(4) No, because E°_{cell} = – 0.287 V

Sol. Answer (3)

(c) $MnO_4^- + 8H^+ + Se^- \rightarrow Mn^{2+} + 4H_2O$

$E^o_{MnO_4^-/Mn^{2+}} = +1.510$

(a) $H_2O \rightarrow \frac{1}{2}O_2 + 2H^+ + 2e^-$

$E^o_{O_2/H_2O} = +1.223\,V$

$\therefore E^o_{cell} = E^o_c - E^o_a$

$= 1.51 - 1.223$

$= +0.287\,V$

Since E^o_{cell} is positive, O_2 will be released.

55. Identify the incorrect statement from the following.

(1) In an atom, all the five 3d orbitals are equal in energy in free state.

(2) The shapes of d_{xy}, d_{yz}, and d_{zx} orbitals are similar to each other; and $d_{x^2-y^2}$ and d_{z^2} are similar to each other.

(3) All the five 5d orbitals are different in size when compared to the respective 4d orbitals.

(4) All the five 4d orbitals have shapes similar to the respective 3d orbitals.

Sol. Answer (2)

In d-subshell

d_{xy}, d_{yz} and d_{xz}, lobes are found between the axis and their shapes are same.

But in $d_{x^2-y^2}$ and d_{z^2}, the lobes are along the axis and their shapes are different.

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

$CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$

[Calculate upto second place of decimal point]

(1) 3.65 g (2) 9.50 g

(3) 1.25 g (4) 1.32 g

Sol. Answer (4)

$$\underset{\substack{95\%\text{Pure}\\ \text{'w' gm}}}{CaCO_3} + \underset{\substack{50\,ml\\ 0.5M}}{2HCl} \rightarrow CaCl_2 + CO_2 + H_2O$$

$$\frac{w}{100} \times \frac{95}{100} = \frac{1}{2} \times 0.5 \times 50 \times 10^{-3}$$

$\therefore w = 1.315\,g$

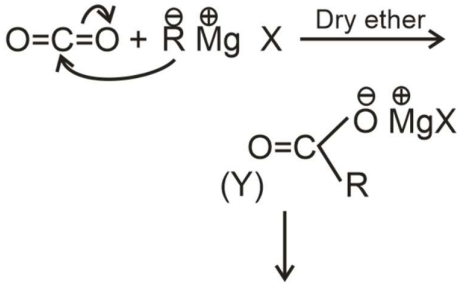
57. $RMgX + CO_2 \xrightarrow[ether]{dry} Y \xrightarrow{H_3O^+} RCOOH$

What is Y in the above reaction?

(1) $RCOO^-X^+$ (2) $(RCOO)_2Mg$

(3) $RCOO^-Mg^+X$ (4) $R_3CO^-Mg^+X$

Sol. Answer (3)



58. Match **List - I** with **List - II.**

List - I	**List - II**
(a) Li	(i) absorbent for carbon dioxide
(b) Na	(ii) electrochemical cells
(c) KOH	(iii) coolant in fast breeder reactors
(d) Cs	(iv) photoelectric cell

Choose the correct answer from the options given below:

(1) (a)-(i), (b)-(iii), (c)- (iv), (d)-(ii)

(2) (a)-(ii), (b)- (iii), (c)- (i), (d)- (iv)

(3) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)

(4) (a)-(iii), (b)- (iv), (c)- (ii), (d)-(i)

Sol. Answer (2)

KOH $\rightarrow$ Absorbs CO_2

Li $\rightarrow$ Used in Electro chemical cells

Na $\rightarrow$ Coolant in fast breeder reactors

Cs $\rightarrow$ Used in photoelectric cells

59. Match **List -I** with **List - II**.

List-I (Drug class)	**List-II (Drug molecule)**
(a) Antacids	(i) Salvarsan
(b) Antihistamines	(ii) Morphine
(c) Analgesics	(iii) Cimetidine
(d) Antimicrobials	(iv) Seldane

Choose the correct answer from the options given below:

(1) (a) - (i), (b) - (iv), (c) - (ii), (d) - (iii)

(2) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)

(3) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)

(4) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

Sol. Answer (4)

Antacids	→	Cimetidine
Antihistamines	→	Seldane
Analgesics	→	Morphine
Antimicrobials	→	Salvarsan

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

(1) $p_i = x_i p$, where p_i = partial pressure of i^{th} gas
x_i = mole fraction of i^{th} gas in gaseous mixture

(2) $p_i = x_i,\ p_i^\circ$ where x_i = mole fraction of i^{th} gas in gaseous mixture
p_i° = pressure of i^{th} gas in pure state

(3) $p = p_1 + p_2 + p_3$

(4) $p = n_1\frac{RT}{V} + n_2\frac{RT}{V} + n_3\frac{RT}{V}$

Sol. Answer (2)

$p_i = x_i\, p_i^\circ$ is mathematical form of Raoult's law rest all represents Dalton's law

i.e.

(i) $p_i = x_i\, p_{Total}$

(ii) $p_{total} = p_1 + p_2 + p_3$

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

61. Which statement regarding polymers is not correct ?

(1) Thermoplastic polymers are capable of repeatedly softening and hardening on heating and cooling respectively.

(2) Thermosetting polymers are reusable.

(3) Elastomers have polymer chains held together by weak intermolecular forces.

(4) Fibers possess high tensile strength.

Sol. Answer (2)

Thermosetting are not remoulded or reshaped ∴ They cannot be reused. Rest all statement are correct.

62. Given below are two statements:

Statement I :

The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole - dipole interactions.

Statement II :

The boiling points of aldehydes and ketones are lower than the alcohols of similar molecular masses due to the absence of H-bonding.

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

(1) Statement I is correct but Statement II is incorrect.

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

Sol. Answer (3)

The boiling points of aldehydes and ketones are comparatively higher than those of hydrocarbons of comparable molecular mass due to appreciable intermolecular attraction (dipole-dipole) between the opposite ends of $\rangle C{=}O$ dipoles.

The boiling point of aldehyde and ketones are lower than corresponding alcohols of comparable molecular mass due to absence of the H-bonding.

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

(1) unununnium (2) ununoctium

(3) ununennium (4) unnilennium

Sol. Answer (3)

119 → ununennium

For 1 → un

9 → enn is used.

64. At 298 K, the standard electrode potentials of Cu^{2+} / Cu, Zn^{2+}/Zn, Fe^{2+}/Fe and Ag^{+}/Ag are 0.34 V, – 0.76 V, – 0.44 V and 0.80 V, respectively.

On the basis of standard electrode potential, predict which of the following reaction can not occur ?

(1) $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$

(2) $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4(aq)$

(3) $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$

(4) $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

Sol. Answer (2)

(1) $E^{o}_{cell} = E^{o}_{c} - E^{o}_{A}$

$= -0.44 - (-0.76)$

$= +0.32\,V$ (will occurs)

(2) $E^{o}_{cell} = E^{o}_{c} - E^{o}_{A}$

$= 0.34 - (0.80)$

$= -0.46\,V$ (will not occurs)

(3) $E^{o}_{cell} = E^{o}_{c} - E^{o}_{a}$

$= 0.34 - (-0.76)$

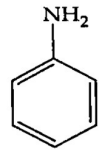
$= +1.10\,V$ (will occurs)

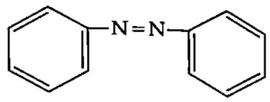
(4) $E^{o}_{cell} = E^{o}_{c} - E^{o}_{a}$

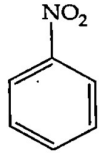
$= 0.34 - (-0.44)$

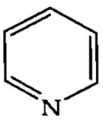
$= +0.78\,V$ (will occurs)

65. The Kjeldahl's method for the estimation of nitrogen can be used to estimate the amount of nitrogen in which one of the following compounds ?

(1) 

(2) 

(3) 

(4) 

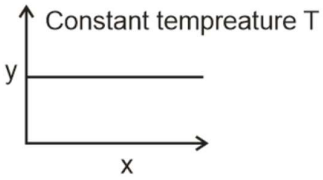
Sol. Answer (1)

Kjeldahl method is not used for the organic compound containing

$-NO_2$ group, –N = N- group,

And N– containing in the ring.

66. The given graph is a representation of kinetics of a reaction.



The y and x axes for zero and first order reactions, respectively are

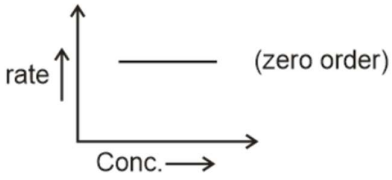
(1) zero order (y = rate and x = concentration), first order (y = $t_{1/2}$, and x = concentration)

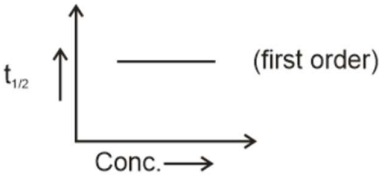
(2) zero order (y = rate and x = concentration), first order (y = rate and x = $t_{1/2}$)

(3) zero order (y = concentration and x = time), first order (y = $t_{1/2}$ and x = concentration)

(4) zero order (y = concentration and x = time), first order (y = rate constant and x = concentration)

Sol. Answer (1)





67. Identify the incorrect statement from the following

(1) Ionisation enthalpy of alkali metals decreases from top to bottom in the group.

(2) Lithium is the strongest reducing agent among the alkali metals.

(3) Alkali metals react with water to form their hydroxides.

(4) The oxidation number of K in KO_2 is +4

Sol. Answer (4)

$KO_2 \rightarrow K^{+} + O_2^{-}$

$\therefore$ O.N. of K = +1

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

Assertion (A):

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

Reason (R):

In an ionic solid, Frenkel defect arises due to dislocation of cation from its lattice site to interstitial site, maintaining overall electrical neutrality.

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

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

(4) Both (A) and (R) are correct but (R) is not the correct explanation (A)

Sol. Answer (4)

In particular point defect ionic solid remains electrically neutral

69. The IUPAC name of the complex- $[Ag(H_2O)_2][Ag(CN)_2]$ is:

(1) dicyanidosilver(I) diaquaargentate(I)

(2) diaquasilver(I) dicyanidoargentate(I)

(3) dicyanidosilver(II) diaquaargentate(II)

(4) diaquasilver(II) dicyanidoargentate(II)

Sol. Answer (2)

IUPAC name is diaquasilver (I) dicyanidoargentate (I)

70. Choose the correct statement:

(1) Diamond is sp^3 hybridised and graphite is sp^2 hybridized.

(2) Both diamond and graphite are used as dry lubricants.

(3) Diamond and graphite have two dimensional network.

(4) Diamond is covalent and graphite is ionic.

Sol. Answer (1)

In diamond carbon atom is in sp^3 hybridisation

In graphite carbon atom is in sp^2 hybridisation

71. Given below are two statements

Statement I:

In the coagulation of a negative sol, the flocculating power of the three given ions is in the order $Al^{3+} > Ba^{2+} > Na^+$

Statement II:

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

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

(1) Statement I is correct but Statement II is incorrect

(2) Statement I is incorrect but statement II is correct

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect.

Sol. Answer (1)

Statement – II is incorrect. The flocculation power of anions is $Na_3PO_4 > Na_2SO_4 > NaCl$

72. Given below are two statements

Statement I:

Primary aliphatic amines react with HNO_2 to give unstable diazonium salts.

Statement II:

Primary aromatic amines react with HNO_2 to form diazonium salts which are stable even above 300 K. In the light of the above statements, choose the most appropriate answer from the options given below

(1) Statement I is correct but Statement II is incorrect.

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect.

Sol. Answer (1)

Statement- II is incorrect. The aromatic diazonium salts are unstable above 300 K

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

(1) high electronegativity

(2) high basic character

(3) small size

(4) high exchange enthalpy

Sol. Answer (4)

Gadolinium has $4f^7 5d^1 6s^2$. It 3rd electron also lost, it will get stable $4f^7$ configuration which has high exchange energy.

74. List Match-List with I-.II

List – I	**List – II**
(Hydrides)	**(Nature)**
(a) MgH_2	(i) Electron precise
(b) GeH_4	(ii) Electron deficient
(c) B_2H_6	(iii) Electron rich
(d) HF	(iv) Ionic

from the options given below correct answer Choose the

(1) (a) – (i), (b) – (ii), (c) – (iv), (d) – (iii)

(2) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)

(3) (a) – (iv), (b) – (i), (c) – (ii), (d) – (iii)

(4) (a) – (iii), (b) – (i), (c) – (ii), (d) – (iv)

Sol. Answer (3)

MgH_2 $\rightarrow$ Ionic

GeH_4 $\rightarrow$ electron precise

B_2H_6 $\rightarrow$ electron deficient

HF $\rightarrow$ electron rich

75. List Match-List with I-.II

List – I	**List – II**
(Products formed)	**(Reaction of carbonyl compound with)**
(a) Cyanohydrin	(i) NH_2OH
(b) Acetal	(ii) RNH_2
(c) Schiff's base	(iii) alcohol
(d) Oxime	(iv) HCN

from the options given below correct answer Choose the

(1) (a) – (i), (b) – (iii), (c) – (ii), (d) – (iv)

(2) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

(3) (a) – (iii), (b) – (iv), (c) – (ii), (d) – (i)

(4) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)

Sol. Answer (2)

Cyanohydrin $\rightarrow$ HCN

Acetal $\rightarrow$ Alcohol

Schiff's base $\rightarrow$ $R–NH_2$

Oxime $\rightarrow$ $NH_2–OH$

76. Given below are two statement:

Statement I:

The boiling points of the following hydrides of group 16 elements increases in the order:

$H_2O < H_2S < H_2Se < H_2Te$

Statement II:

The boiling points of these hydrides increase with increase in molar mass.

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

(1) Statement I is correct but Statement II is incorrect

(2) Statement I is incorrect but Statement II is correct

(3) Both statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

Sol. Answer (4)

Statement I, II are wrong as H_2O has high boiling point in the group due to intermolecular hydrogen bond.

77. The pH of the solution containing 50 mL each of 0.10 sodium acetate and 0.01 M acetic acid is

[Given pK_a of CH_3COOH = 4.57]

(1) 4.57 (2) 2.57

(3) 5.57 (4) 3.57

Sol. Answer (3)

Given solution is acidic buffer solution.

$$pH = pKa + \log\frac{[Salt]}{[Weak\ acid]}$$

$$= 4.57 + \log\frac{0.1}{0.01} = 5.57$$

78. Amongst the following which one will have maximum 'lone pair-lone pair' electron repulsions?

(1) SF_4 (2) XeF_2

(3) ClF_3 (4) IF_5

Sol. Answer (2)

In XeF_2, the central atom Xe has 3 lone pairs around it.

79. The incorrect statement regarding chirality is:

(1) Enantiomers are superimposable mirror images on each other.

(2) A racemic mixture shows zero optical rotation.

(3) S_N1 reaction yields 1 : 1 mixture of both enantiomers.

(4) The product obtained by S_N2 reaction of haloalkane having chirality at the reactive site shows inversion of configuration.

Sol. Answer (1)

The enantiomers are non-superimposable mirror images.

80. Which amongst the following is incorrect statement?

(1) H_2^+ ion has one electron.

(2) O_2^+ ion is diamagnetic.

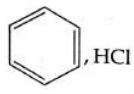
(3) The bond orders of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1, respectively.

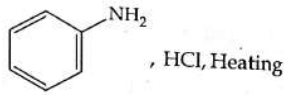
(4) C_2 molecule has four electrons in its two degenerate π molecular orbitals.

Sol. Answer (2)

O_2^+ is paramagnetic, as it has one unpaired electron. ($15e^-$)

81. Which of the following is suitable to synthesize chlorobenzene?

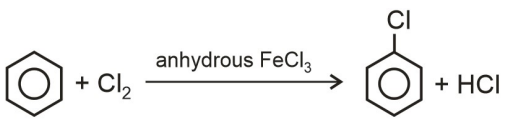
(1) 

(2) 

(3) Benzene, Cl_2, anhydrous $FeCl_3$

(4) Phenol, $NaNO_2$, HCl CuCl

Sol. Answer (3)



82. Which compound amongst the following is not an aromatic compound?

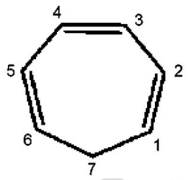
(1) 

(2) 

(3) 

(4) 

Sol. Answer (2)



7^{th} carbon atom is in sp^3 hybridisation.

So the molecule is non-planar and non-aromatic.

83. The incorrect statement regarding enzymes is:

(1) Enzymes are polysaccharides.

(2) Enzymes are very specific for a particular reaction and substrate.

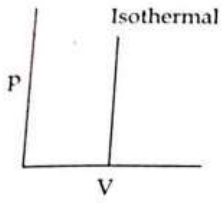
(3) Enzymes are biocatalysts.

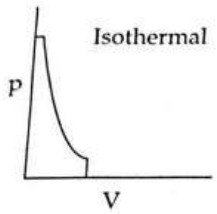
(4) Like chemical catalysts enzymes reduce the activation energy of bio processes.

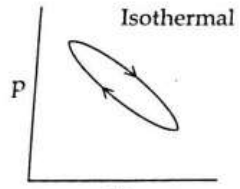
Sol. Answer (1)

Enzymes are proteins.

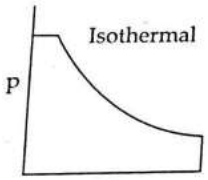
84. Which of the following P-V curve represents maximum work done?

(1) 

(2) 



(3)



(4)

Sol. Answer (4)

The area covered under P-V graph is more.

85. Given below are two statements:

Statement I:

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

Statement II:

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

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

(1) Statement I is correct but Statement II is incorrect

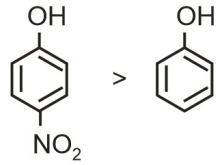
(2) Statement I is incorrect but Statement II is correct

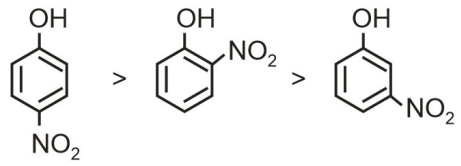
(3) Both statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

Sol. Answer (1)

$$\text{Acidic strength} \propto \text{EWG} \propto \frac{1}{\text{EDG}}$$





Statement I is correct, Statement II incorrect.

86. Compound X on reaction with O_3 followed by Zn/H_2O gives formaldehyde and 2-methyl propanal as products. The compound X is

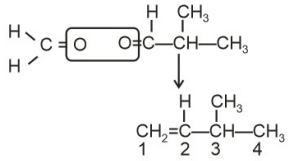
(1) 2-Methyylbut-2-ene

(2) Pent-2-ene

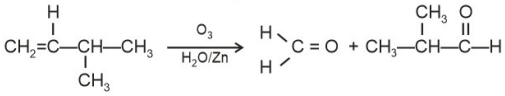
(3) 3-Methylbut-1-ene

(4) 2-Methylbut-1-ene

Sol. Answer (3)



3-methylbut-1-ene



87. $3O_2(g) \rightleftharpoons 2O_3(g)$

for the above reaction at 298 K, K_C is found to be 3.0×10^{-59}. If the concentration of O_2 at equilibrium is 0.040 M then concentration of O_3 in M is

(1) 2.4×10^{31} (2) 1.2×10^{21}

(3) 4.38×10^{-32} (4) 1.9×10^{-63}

Sol. Answer (3)

$3O_2(g) \rightleftharpoons 2O_3(g)$ $K_C = 3.0 \times 10^{-59}$

$$K_C = \frac{[O_3]^2}{[O_2]^3}$$

$$3.0 \times 10^{-59} = \frac{[O_3]^2}{(4.0 \times 10^{-2})^3}$$

$$3.0 \times 10^{-59} \times 64 \times 10^{-6} = [O_3]^2$$

$$64 \times 3 \times 10^{-65} = [O_3]^2$$

$$6.4 \times 3 \times 10^{-64} = [O_3]^2$$

$$[O_3] = 2.52 \times 1.73 \times 10^{-32}$$

$$= 4.359 \times 10^{-32}$$

$$\approx 4.36 \times 10^{-32}$$

88. A 10.0 L flask contains 64 g of oxygen at 27°C. (Assume O_2 gas is behaving ideally). The pressure inside the flask in bar is

(Given R = 0.0831 L bar K^{-1} mol^{-1})

(1) 49.8 (2) 4.9

(3) 2.5 (4) 498.6

Sol. Answer (2)

$PV = nRT$

$$P = \frac{nRT}{V}$$

$$P = \frac{64}{32} \times \frac{0.0831 \times 300}{10}$$

$$P = \frac{2 \times 0.0831 \times 300}{10} = 4.986 \approx 4.9$$

89. Match List - I with List - II.

List - I (Ores)		**List – II (Composition)**
(a) Haematite	(i)	Fe_3O_4
(b) Magnetite	(ii)	$ZnCO_3$
(c) Calamine	(iii)	Fe_2O_3
(d) Kaolinite	(iv)	$[Al_2(OH)_4Si_2O_5]$

(1) (a) – (iii), (b) – (i), (c) – (iv), (d) – (ii)

(2) (a) – (i), (b) – (iii), (c) – (ii), (d) – (iv)

(3) (a) – (i), (b) – (ii), (c) – (iii), (d) – (iv)

(4) (a) – (iii), (b) – (i), (c) – (ii), (d) – (iv)

Sol. Answer (4)

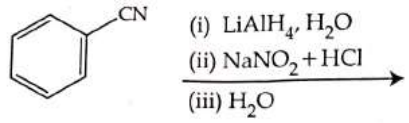
Haematite – Fe_2O_3

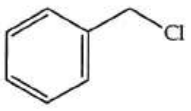
Magnetite – Fe_3O_4

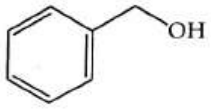
Calamine – $ZnCO_3$

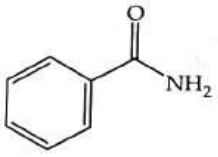
Kaolinite – $[Al_2(OH)_4Si_2O_5]$

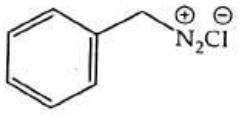
90. The product formed from the following reaction sequence is



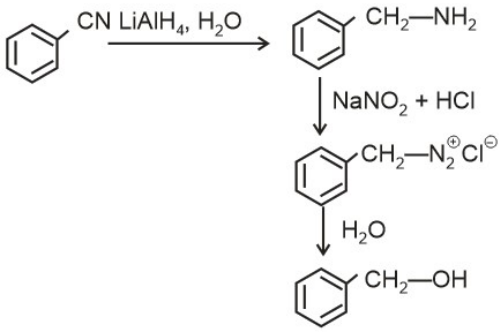
(1) 

(2) 

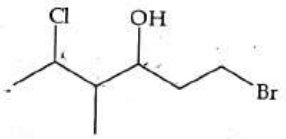
(3) 

(4) 

Sol. Answer (2)



91. The correct IUPAC name of the following compound is:



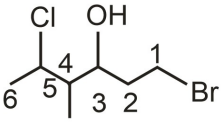
(1) 1-bromo-4-methyl-5-chlorohexan-3-ol

(2) 6-bromo-4-methyl-2-chlorohexan-4-ol

(3) 1-bromo-5-chloro-4-methylhexan-3-ol

(4) 6-bromo-2-chloro-4-methylhexan-4-ol

Sol. Answer (3)



92. The order of energy absorbed which is responsible for the color of complexes

(A) $[Ni(H_2O)_2(en)_2]^{2+}$

(B) $[Ni(H_2O)_4(en)_2]^{2+}$

(C) $[Ni(en)_3]^{2+}$

(1) (C) > (A) > (B) (2) (B) > (A) > (C)

(3) (A) > (B) > (C) (4) (C) > (B) > (A)

Sol. Answer (1)

Energy absorbed $\propto \Delta_0$

Energy absorbed: (C) > (A) > (B)

93. For a first order reaction A $\rightarrow$ Products, initial concentration of A is 0.1 M, which becomes 0.001 M after 5 minutes. Rate constant for the reaction in min^{-1} is

(1) 0.4606 (2) 0.2303

(3) 1.3818 (4) 0.9212

Sol. Answer (4)

$A \rightarrow$ Product

t = 0 0.1 M

t = 5 min 0.001 M

$$K = \frac{2.303}{t}\log\frac{C_o}{C_t}$$

$$K = \frac{2.303}{5}\log\frac{10^{-1}}{10^{-3}}$$

$$K = \frac{2.303}{5}\log 10^2, \frac{2.303}{5}2\log 10$$

$$K = \frac{2.303\times 2}{5} = 0.9212\ min^{-1}$$

94. Copper crystallises in fcc unit cell with cell edge length of 3.608×10^{-8} cm. The density of copper is 8.92 g cm^{-3}. Calculate the atomic mass of copper.

(1) 60 u (2) 65 u

(3) 63.1 u (4) 31.55 u

Sol. Answer (3)

$$d = \frac{Z\times M}{a^3\times N_A}$$

$$8.92\ g\ cm^{-3} = \frac{4\times M}{(3.608\times 10^{-8})^3\times 6.023\times 10^{23}}$$

$$M = \frac{8.92\ g\ cm^{-3}\times(3.608\times 10^{-8})^3 cm^3\times 6.023\times 10^{23}}{4}$$

$$M = \frac{8.92\times 46.96\times 6.023\times 10^{-1} g}{4}$$

$$M = \frac{8.92\times 4.686\times 6.023}{4} = 63.07\ g/mol$$

Atomic mass of Cu = 63.07 u

$\approx$ 63.1 u

95. In radius of second Bohr orbit of the He^+ ion is 105.8 pm, what is the radius of third Bohr orbit of Li^{2+} ion?

(1) 1.587 pm (2) 158.7 Å

(3) 158.7 pm (4) 15.87 pm

Sol. Answer (3)

$$r_n = 52.9\times\frac{n^2}{Z}pm$$

$$105.8 = 52.9\times\frac{4}{2} \quad \ldots(i)$$

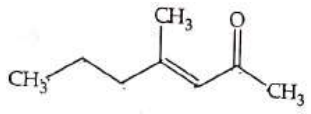
$$r_{Li^{+2},3} = 52.9\times\frac{9}{3} \quad \ldots(ii)$$

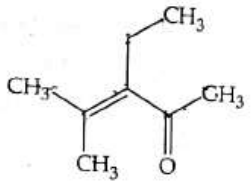
(ii) ÷ (i)

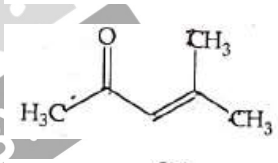
$$\frac{r_{Li^{+2},3}}{105.8} = \frac{52.9\times 3}{52.9\times 2}$$

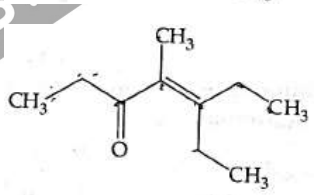
$$r_{Li^{+2},3} = 105.8\times\frac{3}{2} = 158.7\ pm$$

96. Which one of the following is not formed when acetone reacts with 2-pentanone in the presence of dilute NaOH followed by heating?

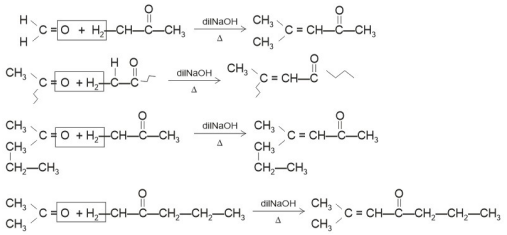
(1) 

(2) 

(3) 

(4) 

Sol. Answer (4)



97. Find the emf of the cell in which the following reaction takes place at 298 K

$Ni(s) + 2Ag^+ (0.001\ M) \rightarrow Ni^{2+}(0.001\ M) + 2Ag(s)$

(Given that $E^\circ_{cell} = 10.5$ V, $\frac{2.303\ RT}{F} = 0.059$ at 298 K)

(1) 0.9615 V (2) 1.05 V

(3) 1.0385 V (4) 1.385 V

Sol. Answer (1)

$$E_{cell} = E^{\circ}_{cell} - \frac{0.059}{n}\log\frac{[P]}{[R]}$$

$E^{\circ}_{cell} = 1.05$ V ($E^{\circ}_{cell} = 10.5$ V(wrong is data)

$$Ni(s) \longrightarrow Ni^{+2}(0.001M) + 2e^{-}$$

$$\underset{(0.001)}{2Ag^{+}} + 2e^{-} \longrightarrow \underset{n=2}{2Ag(s)}$$

$$E_{cell} = E^{\circ}_{cell} - \frac{0.0591}{2}\log\frac{10^{-3}}{(10^{-3})^2}$$

$$E_{cell} = 1.05 - \frac{0.0591}{2}\times 3$$

= 1.05 – 0.0885

= 0.9615 V

98. Given below are two statements:

Statement -I:

In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. HCl + $ZnCl_2$, known as Lucas Reagent.

Statement -II:

Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas Reagent.

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

(1) Statement I is correct but Statement II is incorrect

(2) Statement I is incorrect but Statement II is correct

(3) Both statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

Sol. Answer (1)

Lucas test is used to distinguish 1°, 2° and 3° alcohols.

3° Alcohols $\xrightarrow{\text{Conc HCl+ZnCl}_2}$ instant turbidity

2° Alcohols $\xrightarrow{\text{Conc HCl+ZnCl}_2}$ turbidity after 5-10 mins

1° Alcohols $\xrightarrow{\text{Conc HCl+ZnCl}_2}$ turbidity is not formed at room temperature

Correct order of reactivity 3° > 2° > 1°

So, statement I is correct but statement II is incorrect

99. In the neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from

(1) +7 to +3 (2) +6 to +5

(3) +7 to +4 (4) +6 to +4

Sol. Answer (3)

$$\overset{+7}{2MnO_4^{\ominus}} + H_2O + I^{\ominus} \longrightarrow \overset{+4}{2MnO_2} + 2OH^{-} + IO_3^{\ominus}$$

100. The pollution due to oxides of sulphur gets enhanced due to the presence of:

(a) particulate matter (c) ozone

(c) hydrocarbons (d) hydrogen peroxide

Choose the most appropriate answer from the options given below:

(1) (b), (c), (d) only (2) (a), (c), (d) only

(3) (a), (d) only (4) (a), (b), (d) only

Sol. Answer (4)

$$SO_2(g) + O_2(g) \longrightarrow SO_3(g)$$

Particulate matter catalyses the oxidation SO_2.

$$SO_2(g) + O_3(g) \longrightarrow SO_3(g) + O_2(g)$$

$$SO_2(g) + H_2O_2(l) \longrightarrow H_2SO_4(aq)$$

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