Chemistry Sample Paper

Section-1

Q 1.
The standard cell potential of $Zn|Zn^{2+}_{(aq)} \| Cu^{2+}_{(aq)} Cu$ cell is 1.10 *V*. The maximum work obtained by this cell will be

a) 106.15 *kJ* **b)** *– 212.30 kJ* **c)** *– 318.45 kJ* **d)** *– 424.60 kJ*

Q 2. *0.15g of a substance dissolved in 15g of solvent boiled at a temperature higher by 0.216°C than that of the pure solvent. Calculate the molecular weight of the substance. Molal elevation constant for the solvent is 2.16°C.*

a) *216* ***b)*** *100* ***c)*** *178* ***d)*** *None of these*

Q 3. *Close packing is maximum in the crystal which is-*

a) *Simple cube* ***b)*** *bcc* ***c)*** *fcc* ***d)*** *None of these*

Q 4. *Which one of the following is not a condensation polymer*

a) *Melamine* ***b)*** *Glyptal* ***c)*** *Dacron* ***d)*** *Neoprene*

Q 5. *The charge on the colloidal particle of soap in its solution developed -*

a) *By prefrential adsorption of ions* ***b)*** *The effective ion of soap micelle carries negative charge*

c) *The effective ion of soap micelle carries positive charge* ***d)*** *None of the above*

Q 6. *In blast furnace, iron oxide is reduced by –*

a) *Silica* ***b)*** *CO* ***c)*** *C* ***d)*** *lime stone*

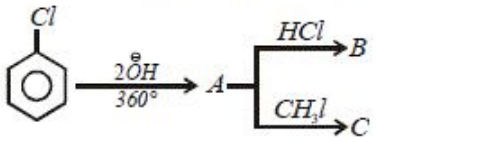
Q 7. *Which of the following element does not form diatomic molecule?*

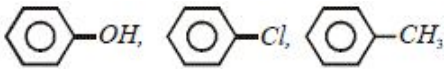
a) *Iodine* ***b)*** *Oxygen* ***c)*** *Phosphorus* ***d)*** *Nitrogen*

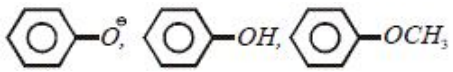
Q 8. *When ethyl alcohol and KI reacted in presence of Na_2CO_3, yellow crystals of..... are formed*

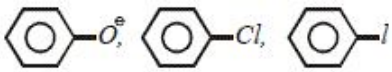
a) CHI_3 ***b)*** CH_3I ***c)*** CH_2I_2 ***d)*** C_2H_5I

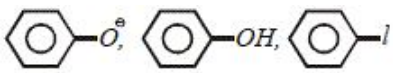
Q 9.
The structures of the compounds / ions A, B and C in the reaction sequence are given by the set :-



a) 

b) 

c) 

d) 

Q 10. *The addition of a catalyst during a chemical reaction alters which of the following quantities?*

a) *Entropy* ***b)*** *Internal energy* ***c)*** *Enthalpy* ***d)*** *Activation energy*

Q 11. *A solid has a structure in which 'A' atoms are located at the cube corners of the unit cell, 'B' atoms are located at the cube*

edges of unit cell and the 'C' atoms at the body centre. Formula of the compound

a) CAB_3 **b)** C_2AB_3 **c)** CA_3B **d)** C_2A_3B

Q 12. *Chlorine reacts with excess ammonia to form*

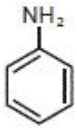
a) NH_4Cl **b)** $N_2 + HCl$

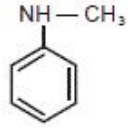
c) $N_2 + NH_4Cl$ **d)** $N_2 + NCl_3$

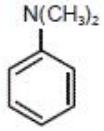
Q 13. *Artificial sweetner which is stable under cold conditions only is:*

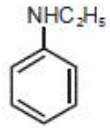
a) Saccharine **b)** Sucralose **c)** Aspartame **d)** Alitame

Q 14. *Which of the following amines will give the carbylamine test?*

a) 

b) 

c) 

d) 

Q 15.

What is the mass of sodium bromate solution necessary to prepare $85.5cm^3$ of 0.672 N solution. When the half cell reaction is-

$BrO^-_3 + 6H^+ + 6e \rightarrow Br^- + 3H_2O$

a) 1.146 g **b)** 1.246g **c)** 1.346 g **d)** 1.446 g

Q 16. *The chemical reaction taking place at the anode of a cell is*

a) Ionisation **b)** Reduction **c)** Oxidation **d)** Hydrolysis

Q 17. *Which of the following is a thermosetting polymer?*

a) PVC **b)** Neoprene **c)** Bakelite **d)** Polythene

Q 18.

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow{dil.H_2SO_4} \underset{\text{Fructose}}{C_6H_{12}O_6\,(aq)} + \underset{\text{Glucose}}{C_6H_{12}O_6(aq)}$$

In this reaction, dilute H_2SO_4 is called

a) Homogeneous catalysis **b)** Homogeneous catalyst **c)** Heterogeneous catalysis **d)** Heterogeneous catalyst

Q 19.

In the redox reaction

$$2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightleftharpoons 2Mn^{2+} + 10CO_2 + 8H_2O$$

The ion acting as autocatalyst is

a) MnO_4^-

b) $C_2O_4^{2-}$

c) H^+

d) Mn^{2+}

Q 20. *Froth floatation process for the concentration of ores is an illustration of the practical application of*

a) *Adsorption* **b)** *Absorption* **c)** *Coagulation* **d)** *Sedimentation*

Q 21. *Phosphorus is kept in :*

a) *Kerosene oil* **b)** *Alcohol* **c)** *Water* **d)** *Ammonia*

Q 22.

Which of the following reactions gives

$H_2C = C = C = CH_2$

a) $CH_2Br - CBr = CH_2 \xrightarrow{Zn/Ch_3OH}$

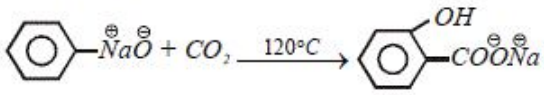
b) $HC \equiv C - CH_2 - COOH \xrightarrow[40^oC]{Aq.K_2CO_3}$

c) $CH_2Br - C \equiv C - CH_2Br \xrightarrow[\text{Heat}]{Zn}$

d) $2CH_2 = CH - CH_2I \longrightarrow$

Q 23.

The reaction



is called :-

a) *Elbs persulphate oxidation* **b)** *Kolbe Schmidt reaction* **c)** *Reimer–Tiemann reaction* **d)** *Lederer–Manasse reaction*

Q 24. *Which of the following oxoacid of sulphur has –O– O– linkage?*

a) H_2SO_3, *sulphurous acid*

b) H_2SO_4, *sulphuric acid*

c) $H_2S_2O_8$, *peroxodisulphric acid*

d) $H_2S_2O_7$, *pyrosulphuric acid*

Q 25. *Which of the following is the correct order of increasing field strength of ligands to form coordination compounds?*

a) $SCN^- < F^- < C_2O_4^{2-} < CN^-$

b) $SCN^- < F^- < CN^- < C_2O_4^{2-}$

c) $F^- < SCN^- < C_2O_4^{2-} < CN^-$

d) $CN^- < C_2O_4^{2-} < SCN^- < F^-$

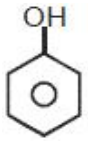
Q 26. *The calculated spin only magnetic moment of* Cr^{2+} *ion is*

a) *3.87 BM* **b)** *4.90 BM* **c)** *5.92 BM* **d)** *2.84 BM*

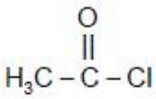
Q 27. *The rate constant for a first order reaction is* $4.606 \times 10^{-3}\ s^{-1}$. *The time required to reduce 2.0 g of the reactant to 0.2 g is:*

a) *100 sec* **b)** *200 sec* **c)** *500 sec* **d)** *1000 sec*

Q 28. *Which of the following will give ester with acid chloride*

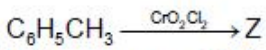
a) 

b) $H_3C - COOH$

c) 

d) *None of these*

Q 29.



In the sequence 'Z' is

a) *Phenyl acetic acid* **b)** *Toluic acid* **c)** *Benzaldehyde* **d)** *Benzoic acid*

Q 30. *Phenol on reaction with Br_2 in non-polar aprotic solvent furnishes*

a) *2, 4, 6 – Tribromophenol* **b)** *p – Bromophenol* **c)** *o – & p – Bromophenol* **d)** *m – Bromophenol*

Q 31. *In DNA the complementary bases are*

a) *adenine & thymine, guanine & cytosine* **b)** *Uracil & adenine, thymine & cytosine*

c) *adenine & gluanine, thymine & cytosine* **d)** *adenine & thymine, gluanine & uracil.*

Q 32. *An aqueous solution containing 28% by mass of a liquid A(mol. mass = 140) has a vapour pressure of 160 mm at 37°C. Find the vapour pressure of the pure liquid A. (The vapour pressure of water at 37°C is 150 mm).*

a) *360 mm* **b)** *150 mm* **c)** *160 mm* **d)** *None*

Q 33. *Time required for completion of ionic reactions in comparison to molecular reactions is*

a) *Maximum* **b)** *Minimum* **c)** *Equal* **d)** *None*

Q 34. *Catalyst used in the oxidation of $SO_2 \rightarrow SO_3$*

a) *Nickel* **b)** *$ZnO.Cr_2O_3$* **c)** *V_2O_5* **d)** *Iron*

Q 35. *The electrolytic method of reduction is employed for the preparation of metals that*

a) *Are weakly electropositive* **b)** *Are moderately electropositive* **c)** *Are strongly electropositive* **d)** *Form oxides*

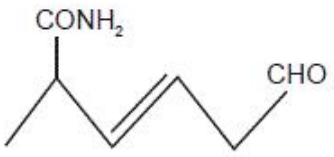
Q 36. *Which statement is not correct for nitrogen?*

a) *It has a small size* **b)** *It does not readily react with O_2*

c) *It is a typical non-metal* **d)** *d-orbitals are available for bonding*

Q 37.

The IUPAC name of the compound

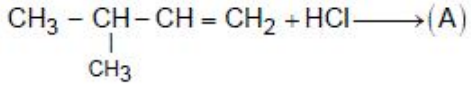


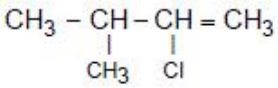
a) *5 – Carbamoylhex – 1 – enal* **b)** *2 – Carbamoylhex – 3 – enal*

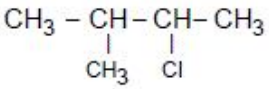
c) *2 – Methyl – 6 – oxohex – 3 – enamide* **d)** *6 – Keto – 2 – Methylhexanamide*

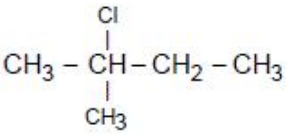
Q 38.

Product of the following Reaction:- (major product)



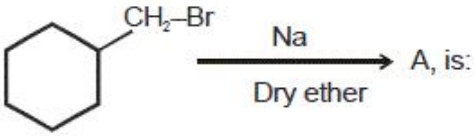
a) 

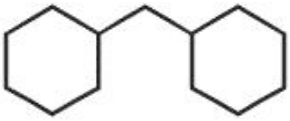
b) 

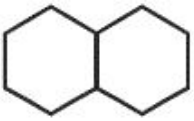
c) 

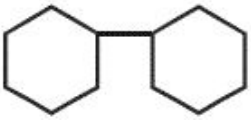
d) *None of the above*

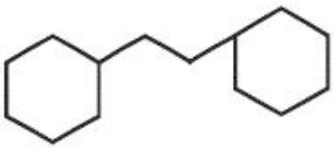
Q 39.



a) 

b) 

c) 

d) 

Q 40. *The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha carbon is*

a)
a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation

b)
the carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol and this process is known as ketoenol tautomerism

c) *a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol*

d)
a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibrium

Q 41. *Which of the following statements is incorrect?*

a) *Enzymes are in colloidal state*

b) *Enzymes are catalysts*

c) *Enzymes can catalyse any reaction*

d) *Urease is an enzyme*

Q 42. *The ease of adsorption of the hydrated alkali metal ions on an ion-exchange resins follows the order:*

a) $K^+ < Na^+ < Rb^+ < Li^+$

b) $Na^+ < Li^+ < K^+ < Rb^+$

c) $Li^+ < K^+ < Na^+ < Rb^+$

d) $Rb^+ < K^+ < Na^+ < Li^+$

Q 43. *Arrange Ce^{3+}, La^{3+}, Pm^{3+} & Yb^{3+} in the increasing order of their ionic radii*

a) $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

b) $Ce^{3+} < Yb^{3+} < Pm^{3+} < La^{3+}$

c) $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$

d) $Pm^{3+} < La^{3+} < Ce^{3+} < Yb^{3+}$

Q 44.

Match List-I and List-II

List-I	List-II
A. Frenkel defect	I. Due to presence of foreign atoms at the lattice sites in place of host atoms
B. Schottky defect	II. Due to missiong of cation from regular site & presence of cation having higher charge in the adjacent lattice site
C. Impurity defect	III. Due to missing of cations from regular lattice site and occupy interstitial sites
D. Metal deficiency defect	IV. Due to missing of equal number of cations and anions from lattice site

a) A-IV, B-II, C-III, D-I **b)** A-IV, B-III,C-II, D-I **c)** A-III, B-II, C-I, D-IV **d)** A-III, B-IV, C-I, D-II

Directions for question 45: *The following questions contain two statements. Choose the correct answer from the following options given below*
(a) when both S-I and S-II are correct.
(b) when both S-I and S-II are wrong.
(c) when S-I is correct and S-II is wrong.
(d) when S-I is wrong and S-II is correct.

Q 45. *S-I: Colligative properties depends on both nature and number of solute particle.*
S-II: The Van't Hoff factor for K_2SO_4 (α = 75%) is 3.

a) **b)** **c)** **d)**

Directions for questions 46 to 50:
Arrhenius gave an equation which describes rate constant k as a function of temperature as
$k = Ae^{-Ea/RT}$
where k is a rate constant
A is frequency factor or pre exponential factor
Ea is activation energy
T is tempeature in Kelvin and
R is universal gas constant
Equation when expressed in logarithmic form becomes

$$\text{Log}_{10}k = \log_{10}A - \frac{E_a}{2.303RT}$$

Q 46. *For a reaction E_a = 0 and k = 3.2 × 10^8 s^{-1} at 325 K. The value of k at 335 K would be*

a) 3.2 × 10^8 s^{-1} **b)** 6.4 × 10^8 s^{-1} **c)** 12.8 × 10^8 s^{-1} **d)** 25.6 × 10^8 s^{-1}

Q 47. *For which of the following k_{310}/k_{300} would be maximum?*

a) $P + Q \longrightarrow R$; E_a = 10 kJ

b) $E + F \longrightarrow D$; E_a = 21 kJ

c) $A + B \longrightarrow C;\ E_a = 10.5\ kJ$

d) $L + M \longrightarrow N;\ E_a = 5\ kJ$

Q 48.

Activation energies of two reactions are E_{a_1} and E_{a_2} with $E_{a_1} > E_{a_2}$. If the temperature of the reacting system is increased from T_1 to T_2 (k^1 are rate constants at higher temperature), which of the following is correct?

a) $\frac{k_1'}{k_1} = \frac{k_2'}{k_2}$

b) $\frac{k_1'}{k_1} < \frac{k_2'}{k_2}$

c) $\frac{k_1'}{k_1} > \frac{k_2'}{k_2}$

d) $\frac{k_1'}{k_1} > \frac{2k_2'}{k_2}$

Q 49.

For the reactions, following data is given

$P \longrightarrow Q\ k_1 = 10^{15} \exp.\left(\frac{-2000}{T}\right)$

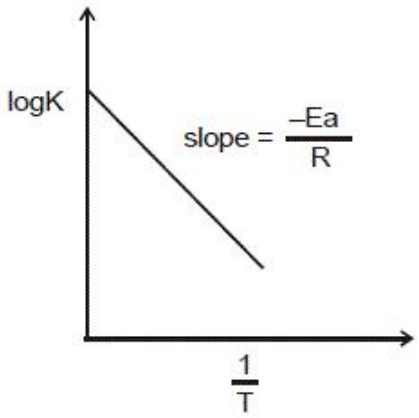
$C \longrightarrow D\ k_2 = 10^{14} \exp.\left(\frac{-1000}{T}\right)$

Temperature at which $k_1 = k_2$ is

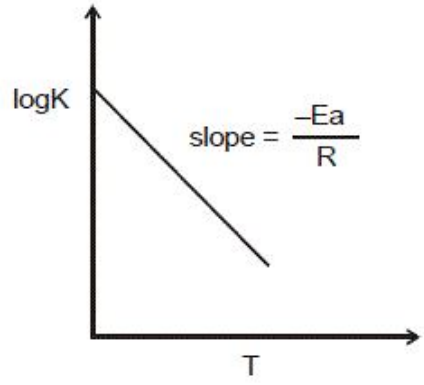
a) *434.22 K* **b)** *1000 K* **c)** *2000 K* **d)** *2000 K*

Q 50. *Which of the following graph represents correct?*

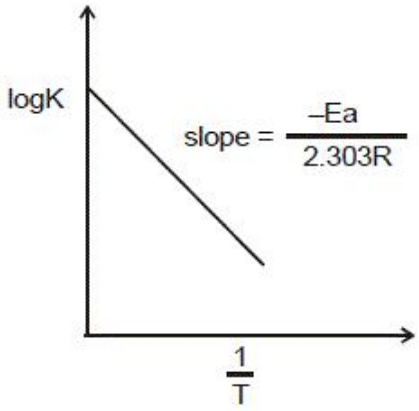
a)



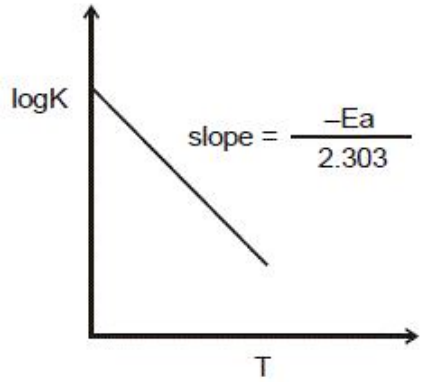
b)



c)



d)



Chemistry Sample Paper

1	**b**	2	**b**	3	**c**	4	**d**	5	**b**	6	**b**	7	**c**	8	**a**	9	**b**	10	**d**	11	**a**	12	**c**	13	**c**	14	**a**	15	**d**	16	**c**
17	**c**	18	**b**	19	**b**	20	**a**	21	**a**	22	**c**	23	**b**	24	**c**	25	**a**	26	**b**	27	**c**	28	**a**	29	**c**	30	**c**	31	**a**	32	**a**
33	**b**	34	**d**	35	**c**	36	**d**	37	**c**	38	**c**	39	**d**	40	**b**	41	**a**	42	**d**	43	**c**	44	**d**	45	**b**	46	**a**	47	**b**	48	**c**
49	**a**	50	**c**																												

Q 1. Ans: **b**

Here it is given that

$w = 0.15$ g, $\Delta T_b = = 0.216^0C$

$W = 15g$ $K_b = 2.16^0C$

$m = ?$

Substituting values in the expression ,

$$m = \frac{1000 \times K_b \times w}{\Delta T_b \times W}$$

$$m = \frac{1000 \times 2.16 \times 0.15}{0.216 \times 15} = 100$$

Q 2. Ans: **b** **Solution:**

Q 3. Ans: **c** **Solution:**The close packing in the crystal is 0.52, 0.68 and 0.74 for simple cubic, bcc, and fcc respectively. i.e the close packing is maximum in fcc.

Q 4. Ans: **d** **Solution:**Neoprene is an addition polymer of isoprene.

$$RCOONa \rightarrow RCOO^- + Na^+$$

Q 5. Ans: **b** **Solution:** The active species of soap is negatively charged.

Q 6. Ans: **b** **Solution:** $FeO + CO \longrightarrow Fe + CO_2$

Q 7. Ans: **c**

$$C_2H_5OH \xrightarrow[Na_2CO_3]{KI} CHI_3$$

Q 8. Ans: **a** **Solution:**

Q 9. Ans: **b**

Q 10. Ans: **d** **Solution:**A catalyst provide an alternative route for the reaction with a lower activation energy.

A $\rightarrow$ corners $\Rightarrow 8 \times \frac{1}{8} = 1$ A_1

B $\rightarrow$ edges $\Rightarrow 12 \times \frac{1}{4} = 3$ B_3

C $\rightarrow$ body centre $\Rightarrow 1 \times 1 = 1$ C_1

$\therefore$ Formula of the compound is AB_3C or CAB_3.

Q 11. Ans: **a** **Solution:**

$$3Cl_2 + \underset{(excess)}{8NH_3} \longrightarrow 6NH_4Cl + N_2 \uparrow$$

Q 12. Ans: **c** **Solution:**

Q 13. Ans: **c** **Solution:**Aspartame is stable under cold conditions.

Q 14. Ans: **a** **Solution:**Aliphatic & aromatic primary amines give carbyl amine test secondary & tertiary amines don't show this reaction.

Since 6e are involved in the reaction, we have

$$\text{Molarity} = \frac{\text{Normality}}{6} = \frac{0.672}{6} = 0.112M$$

Molar mass of $NaBrO_3 = 151$ g mol^{-1}

Mass of $NaBrO_3$ needed to prepare required solution

$$= \left(\frac{0.112}{1000} \times 855\right) \times 151 = \mathbf{1.446\ gm.}$$

Q 15. Ans: **d** **Solution:**

Q 16. Ans: **c**

Q 17. Ans: **c** **Solution:**Bakelite is a thermosetting polymer.

Q 18. Ans: **b** **Solution:**Because reactant and catalyst are present in same physical state.

$$n\underset{\text{Propylene}}{CH_3-CH=CH_2} \xrightarrow{(CH_3CH_2)_3Al+TiCl_4} \left[\begin{array}{c} CH_3 \\ | \\ -CH_2-CH- \end{array}\right]_n$$

Q 19. Ans: **b** **Solution:**

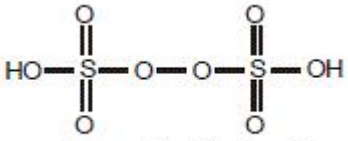
Q 20. Ans: **a**

Q 21. Ans: **a**

$$CH_2Br-C\equiv C-CH_2Br \xrightarrow[\Delta]{Zn} CH_2=C=C=CH_2$$

Q 22. Ans: **c** **Solution:**

Q 23. Ans: **b**



Peroxodisulphuric acid

Q 24. Ans: **c** **Solution:**

Spectrochemical series (as given in NCERT)

$I^- < Br^- < SCN^- < Cl^- < S^{2-} < F^- < OH^- < C_2O_4^{2-} < H_2O < NCS^-$ $< EDTA^{4-} < en < CN^- < CO$

Q 25. Ans: **a** **Solution:**

Cr : [Ar] $3d^5\ 4s^1$

Cr^{2+}: [Ar] $3d^4$

Number of unpaired e^- = 4

Spin only magnetic moment = $\sqrt{n(n+2)}$

n = number of unpaired e^-

$\therefore$ Spin only magnetic moment = $\sqrt{4(4+2)} = \sqrt{24}$

= 4.9 BM

Q 26. Ans: **b** **Solution:**

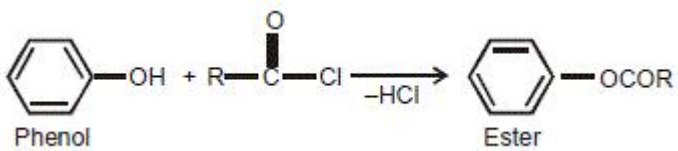
$$K=\frac{2.303}{t}\log\frac{[A]}{[A]_t}$$

$$4.606\times10^{-3}=\frac{2.303}{t}\log\frac{2}{0.2}$$

$$=\frac{2.303}{t}\log10$$

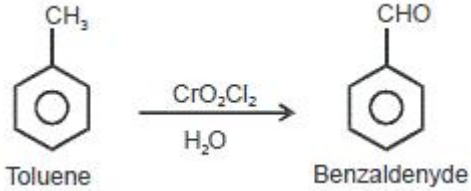
$$\therefore t=\frac{2.303}{4.606\times10^{-3}}=\frac{10^3}{2}=\frac{1000}{2}=500 \text{ sec.}$$

Q 27. Ans: **c** **Solution:**



Phenol Ester

Q 28. Ans: **a** **Solution:**



Toluene Benzaldenyde

Q 29. Ans: **c** **Solution:**

Q 30. Ans: **c** **Solution:**In presence of non-protic solvent such as $CHCl_3$ or CCl_4 concentration of electrophile (Br^+) is less. Hence reaction stops at the monobromo stage.

Q 31. Ans: **a** **Solution:**In DNA adenine faces thymine & guanine faces cytosine.

Q 32. Ans: **a** **Solution:**

Q 33. Ans: **b** **Solution:**Ionic reactions are very fast reactions i.e. take place instantaneously.

Q 34. Ans: **d** **Solution:**

$$2SO_2 + O_2 \xrightarrow[As_2S_3\,(\text{Poison})]{\text{Platinised asbestos(catalyst)}} 2SO_3$$

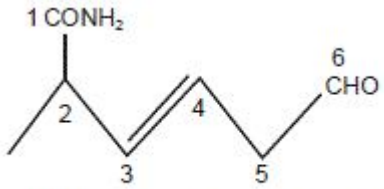
Q 35. Ans: **c**

Q 36. Ans: **d** **Solution:**

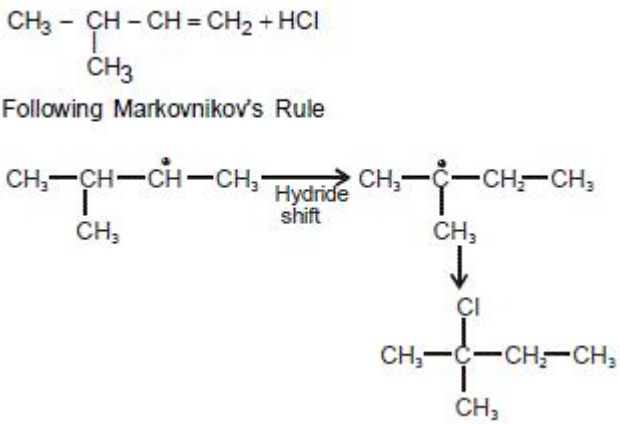
$N_7 \rightarrow 1s^2,\ 2s^2,\ 2p^3$

d-orbitals are absent in nitrogen.

Q 37. Ans: **c** **Solution:**



2–Methyl – 6 – oxohex – 3 – enamide



Q 38. Ans: **c** **Solution:**

Q 39. Ans: **d**

Q 40. Ans: **b** **Solution:**Explanation given in the question itself.

Q 41. Ans: **a** **Solution:**Ptyline (enzyme) is present in saliva.

Q 42. Ans: **d**

Q 43. Ans: **c** **Solution:**Due to Lanthanoid contraction, order will be (increasing order of radii) $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

Q 44. Ans: **d** **Solution:**A-III, B-IV, C-I, D-II

Q 45. Ans: **b**

Q 46. Ans: **a**

Q 47. Ans: **b**

Q 48. Ans: **c**

Q 49. Ans: **a**

Q 50. Ans: **c**