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Paper-1

(Chemstriy)

PART-A

⇒ **MCQ's** **[50]**

1. Diamond has fcc crystal structure in which each carbon atom is attached with four other carbon atoms, then the number of carbon atoms per unit cell in diamond are.....

(A) 12 (B) 6 (C) 8 (D) 4

2. The defect due to which crystal of NaCl sows yellow colour is.....

(A) Frenkel defect (B) Impurity defect

(C) Schottky defect (D) Metal excess defect due to vacancy by anion

3. Which of the following is the unit cell dimensions of $K_2Cr_2O_7$?

(A) $a \neq b \neq c,\ a \neq \beta \neq \gamma \neq 90^o$ (B) $a = b = c,\ a = \beta = \gamma = 90^o$

(C) $a \neq b \neq c,\ a = \beta = \gamma = 90^o$ (D) $a = b \neq c,\ a = \beta = \gamma \neq 90^o$

4. How many number of tetrahedral voids in a closed packed structure having 6×10^{24} atoms ?

(A) 6×10^{25} (B) 3×10^{24} (C) 1.2×10^{25} (D) 1.2×10^{23}

5. Which colligative property is more useful to determine the molecular wright of the substances like proteins and polymers ?

(A) Lowering of vapour pressure (B) Elevation in boiling point

(C) Depression of freezing point (D) Osmotic pressure

6. Which of the following factors affect the colligative properties of solution ?

(A) Nature of solute (B) Nature of solvent

(C) Number of solvent molecules (D) Number of solute particles

7. Opening and closing of flower is controlled by....

(A) capillary action (B) hydrolysis (C) diffusion (D) osmosis

8. Homogeneous mixture of camphor in N_2 is an example of

(A) Gas solute - Solid solvent (B) Solid solute - Liquid solvent

(C) Solid solute - Gas Solvent (D) Liquid solute - Solid solvent

9. The relative lowering in vapour pressure and mole fraction of a solvent in a 1.5 modal aqueous solution obeying Raoult's law far non volatile solute and volatile solvent.

(A) 0.26 bar, 0.74 (B) 2.6 bar, 0.99 (C) 0.026 bar, 0.97 (D) 0.96 bar, 0.98

10. Which of the following relation is true for standard gibbs free energy change (ΔG^o) and equllibrium constant Kp ?

(A) $Kp = e^{-\Delta G^o/RT}$ (B) $Kp = -RT \text{ In } \Delta G^o$

(C) $Kp = \left(\frac{e}{RT}\right)^{\Delta G^o}$ (D) $Kp = \frac{\Delta G^o}{RT}$

11. If 2.7 gm aluminum metal is deposited on electrodes when two different electrolytic cells having molten $Cu(NO_3)_2$ and $AI(NO_3)_3$ respectively are arranged in series, then how much copper metal is produced ? (Cu = 63.5 ; Al = 27.0 gm mol^{-1})

(A) 9.525 gm (B) 31.75 gm (C) 63.5 gm (D) 190.5 gm

12. Which of the following reaction is true at 25°C for given cell ?

Cell : Pt | $Br_{2(l)}$ | $Br_{(aq)}$ || $Cl_{(aq)}$ | $Cl_{2(aq)}$ | Pt

(A) $2Br_{(aq)} + Cl_{2(g)}$ --- $2Cl_{(aq)} + Br_{2(l)}$ (B) $Br_{2(l)} + 2Cl^-_{(aq)}$ --- $Cl_{2(g)} + 2Br_{(aq)}$

(C) $Br_{2(l)} + Cl_{2(g)}$ -- $2Br_{(aq)} + 2Cl_{(aq)}$ (D) $2Br_{(aq)} + 2Cl_{(aq)}$ --- $Br_{2(l)} + Cl_{2(g)}$

13. Which of the following give H_2 on cathode and O_2 on anode on electrolysis by using platimum electrode ?

(A) Molten NaCl (B) Dilute solution of NaCl

(C) Concentrated solution of NaCl (D) Solid NaCl.

14. The half life period for a first order reaction is

(A) proportional to concentration.

(B) independent of concentration

(C) inversely proportional to concentration

(D) inversely proportional to the square of the concentration.

15. The value of rate constant for a first order reaction is 2.303×10^{-2} sec^{-1}. What will be the time required to reduce the concentration to $\frac{1}{10}$th of its initial concentration ?

(A) 10 second (B) 100 second (C) 2303 second (D) 230.3 second

16. Total order of reaction $X + Y \rightarrow XY$ is 3. The order of reaction with respect to X is 2. State the differential rate equation for the reaction.

(A) $-\frac{d[x]}{dt} = K[X]^3[Y]^o$ (B) $-\frac{d[x]}{dt} = K[X]^o[Y]^3$

(C) $-\frac{d[x]}{dt} = K[X]^2[Y]$ (D) $-\frac{d[x]}{dt} = K[X][Y]^2$

17. Which type of colloid is the dissolution of sulphur (S_8) ?

(A) Associated colloid (B) Micelle

(C) Multimolecular colloid (D) Macromolecular colloid

18. For adsorption phenomenon

(A) ΔH = +ve, ΔS = –ve (B) ΔH = –ve, ΔS = +ve

(C) ΔH = –ve, ΔS = –ve (D) ΔH = +ve, ΔS = +ve

19. Which one is the best coagulating substance for Fe (OH)3 colloid ?

(A) K_3PO_4 (B) KNO_3Q-19 (C) NaCl (D) $MgSO_4$

20. Which of the following is not suitable for chemisorption ?

(A) It is irreversible

(B) It is multimolecular

(C) Depends upon nature of gas

(D) There is no noticeable effect of change in temperature

21. Whichof the following metal is purified by Mond Carbonyl method ?
(A) Zr (B) Ti (C) Ge (D) Ni

22. Which compound is added as foam stabiliser in froath floatation process ?
(A) Toluene (B) Benzene (C) Aniline (D) Benzoic acid

23. Which of the following oxo-acid is not possible ?
(A) $HOClO_2$ (B) $HOFO_2$ (C) $HOBrO_2$ (D) $HOIO_2$

24. What is the geometrical shape of XeO_3 ?
(A) Planar triangular (B) Trigonal pyramidal
(C) Square planar (D) Tetrahydral

25. Which of the following mixture is called Aquaregia ?
(A) Two parts of conc. HCl and two parts of conc. HNO_3
(B) Three parts of dil.HCl and 1 part of conc. HNO_3
(C) Three parts of conc. HCl and 1 part of dil. HNO_3
(D) Three parts of conc. HCl and 1 part of conc. HNO_3.

26. In which of the following atom possesses highest oxidation state ?
(A) $(n - 1)d^3ns^2$ (B) $(n-1)d^5ns^2$ (C) $(n-1)d^8ns^2$ (D) $(n-1)d^5ns^2$

27. In which of the following ion d-d transition is not possible ?
(A) Mn^{2+} (B) Cu^{2+} (C) Ti^{4+} (D) Cr^{3+}

28. Which of the following complex does not show geometrical isomer ?
(A) $[Cr(OX)_3]^{3-}$ (B) $[Co(NH_3)_3(NO_2)_3]$
(C) $[Co(NH_3)_4Cl_2]^+$ (D) $[Fe(NH_3)_2(CN)_4]^-$

29. What is the cyclic complex compound by metal ion and polydentate ligand ?
(A) Chelate complex (B) Simple complex
(C) Polycentered complex (D) None of these

30. Which of the following complex sp^3d^2 type hybridization ?
(A) $[Fe(NH_3)_6]^{3+}$ (B) $[Fe(Cl)_6]^{3-}$ (C) $[Fe(CN)_6]^{3-}$ (D) $[Fe(CN)_6]^{4-}$

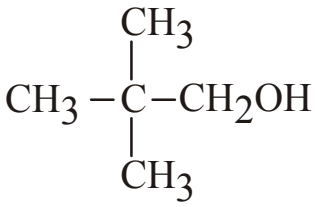
31. Which one is the Swartz reaction from the following ?
(A) $CH_3Cl + NaI \xrightarrow{\text{acetone}} CH_3I + NaCl$ (B) $CH_3Br + NaI \xrightarrow{\text{acetone}} CH_3I + NaBr$
(C) $CH_3Br + AgF \longrightarrow CH_3F + AgBr$ (D) $2CH_3Cl + 2Na \xrightarrow{\text{Dry ether}} CH_3 . CH_3 + 2 NaCl$

32. Which of the following is allylic halide ?
(A) Benzyl chloride (B) (1 - bromo ethyl) benzene
(C) 1 - bromo benzene (D) 3 - chloro cyclo hex - 1 - ene

33. Which of the following compound gives only one monochloro product on its chlorination in presence of sunlight ?
(A) Iso pentane (B) n - pentane (C) Neo pentane (D) n - butane

34. 1, 2-dichloro ethane is which type of halide ?
(A) Geminal halide (B) Vicinal halide (C) Alkylidene halide (D) Allylic halide

35. Which of the following compound having mixture obtained on fermentation ?
(A) 1- propanol (B) Ethanol (C) Glucose (D) Glycerol

36.  How this compound respond the Lucas test ?
(A) No reaction (B) Coloured layer formed
(C) Oily droplets appear (D) Mixture becomes milky white

37. In which of the following reactionsof alcohol there is no cleavage of C-O bond ?
(A) Oxidation reaction of alcohol
(B) Dehydration reaction of alcohol
(C) Reduction reaction of alcohol
(D) Reaction of alcohol with phosphorous tribromide

38. Which one of the following compounds do not give primary alcohol on reduction ?
(A) Propanoic acid (B) Propanal (C) Methyl propanoate (D) Propan-2-one

39. Which reagents from the following give aldehyde by reacting with primary alcohol ?
(A) PCC + CH_2Cl_2 (B) $KMnO_4$ + H_2SO_4
(C) $KMnO_4$ + KOH (D) $Na_2Cr_2O_7$ + H_2SO_4

40. Which of the following is the correct order of acidic strength ?
(A) $CH_3COOH > ClCH_2COOH > Cl_2CHCOOH > Cl_3$. C . COOH
(B) Cl_3 . C . COOH > Cl_2CH . COOH > Cl. CH_2 COOH > CH_3COOH
(C) $CH_3COOH > Cl_3$. C . COOH > Cl_2CH . COOH > Cl . CH_2COOH
(D) $CH_3COOH > ClCH_2COOH > Cl_2$. CH . COOH > CH_3COOH

41. What is IUPAC name for isophthalic acid ?
(A) Benzene-1, 3-dicarboxylicacid (B) Benzene-1, 2-dicarboxylicacid
(C) Benzene-1, 4-dicarboxylicacid (D) Benzene-1, 5-dicarboxylicacid

42. Which compound does not give Benedict test ?
(A) C_6H_5CHO (B) $(CH_3)_2$. CHCHO
(C) CH_3CHO (D) $(CH_3)_3C.HCHO$

43. Which of the following substance does not react with C6H5SO2Cl ?
(A) $(C_2H_5)_3N$ (B) $(CH_3)_2NH$ (C) CH_3NH_2 (D) $C_2H_5NH_2$

44. Which of the following pair is used as reagent in carbyl amine reaction ?
(A) $CHCl_3$ and Alcoholic KOH (B) KOH and HNO_2
(C) KI and CHI_3 (D) $CHCl_3$ and $NaNO_2$

45. What is the IUPAC name of vinyl cyanide ?
(A) Propane nitrile (B) Butane nitrile (C) Prop-2-ene-nitrile(D) Ethane nitrile

46. Which is not true for glucose ?
(A) -CH2OH group (B) -CHO group (C) Four- CHOH group (D) One C = O group

47. Base sugar phosphate unit of nuclic acid is known as.....
(A) nucleotide (B) nucleoside (C) phosphotide (D) none of these

48. Which base is present in place of thiamine in RNA ?
(A) Uracil (B) Cytosine (C) Guanine (D) Adenine

49. Which amino acid contain secondary amino group in its structure ?
(A) Glycine (B) Lysine (C) Alanine (D) Proline

50. Sodalime is the mixture of
(A) NaOH and CaO in the ratio of 1 : 3
(B) NaOH and CaO in the ratio of 3 : 1
(C) Na_2CO_3 and $NaHCO_3$ in the ratio of 1 : 1
(D) NaOH and $Ca(OH)_2$ in the ratio of 1 : 3

PART-B

SECTION : A

⇒ **Answer the following questions in short**

1. Ferric oxide crystallizes in a hexagonal close packed array of oxide ions with two out of every three octahedral holes occupied by ferric ions. Desive the formula of the ferric oxide.
2. Calculate the electrode potential of a copper wire dipped in 0.1 m cuso4 solution at 25°C. The standard electrode potential of copper is 0.34 volt.
3. Define : (i) Order of reaction (ii) molecularitz
4. Explain how the phenomenon of adsorption finds application in the following processes?
(i) production of high vaccum (ii) Heterogeneous catalysis
5. Write the principle behind the froth float – action process. What is the role of collectors in this process?
6. Out of H_2O and H_2S which one has higher bond angle and why?
7. Write any tow characteristics of transition elements. Why are they called transition elements? Which of the d- block elements may not be regarded as the transition elements?
OR
7. Name the common elements present as anode mud in the electrolytic refining of copper. Why are they so present?
8. Write the reactions involved when D – glucose is treated with the following reagents.
(i) HNO_3 (ii) Bromine water
OR
8. Write the chemical reaction f aniline with benzoyl chloride and also write the name of the product obtained.

SECTION – B

Answer the following question in detail

9. Calculate packing efficiency in body centred cubic structure. (figure is not required)
10. A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes. What mass of Ni is deposited at the cathode? (Atomic mass of = 58.7 Ni)
11. Explain the following terms with suitable examples.
(i) Aerosol (ii) Gel (iii) Emulsion

12. (i) Write the equation which are involved in the oxidation of hydrogen sulphide to sulphur by potassion permanganate solution.

OR

12. Name the following coordination entities and draw the structures of their steneoisomers
(i) $[Co(en)_2\ Cl_2)^+$ (ii) $[Cr(C_2O_4)_3]^{2-}$
13. Explain 'SN' reaction mechanism.
14. Write the equation involved in the following reactions.
(i) Wolff – kishner reduction (ii) Etard reaction.

OR

14. Primary alkyl halide CuH_9Br (a) reacted with alcoholic KOH to give compound (b) compound (b) is reacted with HBr to give (c) which is an isomer of (a). when (a) is reacted with sodium metal it gives comound (d). C_8H_{18} which different from the compound formed when n – butyl bromide is reacted with sodium. Give the structural formula of (a) and write the equations for all the reactions.

SECTION – C

⇒ **Answer the following as aksed.**

15. Two elements A and B form compounds having molecular formula AB_2 and AB_4. When dissolved in 20 gm of benzene (C_6H_6), 1g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K the molar depression constant for benzene is 5.1 K kg mol^{-1} calculate atomic masses of A and B.
16. (a) List the factor on which the rate of a chemical reaction depends.
(b) the half – life for the decay of radioactive C is 5730 years. An archaeological artifact containing wood has only 80% of the C activity as found in living trees. Calculate the age of the artifact.
17. (i) A solution of $[Ni(CH_2O)_6]^{2+}$ is green but a solution of $[Ni(CN)_4]^{2-}$ is colourless. Explain
(ii) Write down the IUPAC name for each of the following complextes.
(a) $K[Cr(H_2O)_2(OX)_2].3H_2O$ (b) $[CrCl_3(py)_3]$

OR

17. (i) An aldehyde A ($C_{11}H_{80}$) which does not undergo self aldol condensation, gives benzaldehyde and 2 mole of B on ozonolysis. Compound B on oxidation with silver ion gives oxalic acid. Identify the compounds A and B.
(ii) Give the structures of the following (a) phthaldehyde (b) Hemiacetal
18. Show how will you synthesise:
(i) I – phenylethanol from a suitable alkene.
(ii) cyclohexyl methanol using an alkylhalide by an SN^2 reaction.

★★★

Paper-2

(Chemstriy)

PART-A

⇒ **MCQ's** **[50]**

1. Which of the following is correct distance of edge in crystal unit in ZnS ?
   (A) a = b ≠ c (B) a = b = c (C) a ≠ b = c (D) a ≠ b ≠ c
2. An element posses cubic lose packing structure. Calculate the radium (....) of the atom in the unit cell [Edge length a = 252 nm].
   (A) 152 nm (B) 89.36 nm (C) 12.6 nm (D) 109.1 nm
3. Which of the following is an amorphous solid ?
   (A) Graphite (C) (B) Quartz glass (SIO_2)
   (C) Chrome alum (D) Silicon carbide (SiC)
4. Iodine molecules are hled in the crystals lattice by.....
   (A) London forces (B) dipole-dipole interactions
   (C) covalent bonds (D) coulombic forces
5. At 300 K temperature 2.5 gram unknown substance is dissolved in solvent and made the volume 4 liter of the solution. Its osmotic pressure is found to be 0.2 bar. Calculate the molar mass of unknown substance.
   (A) 19.95 gms/mole (B) 77.94 gms/mole (C) 199.5 gms/mole (D) 779.4 gms/mole
6. Which of the following is not a colligative property ?
   (A) Depression in freezing point (B) Elevation in boiling point
   (C) Boiling point (D) Relative lowering in vapour pressure
7. Which of the following pairs show an ideal solution ?
   (A) Water - Nitric acid (B) Benzene - Toluene
   (C) Acetone - Chloroform (D) Phenol - Aniline
8. The unit of ebulioscopic constant is .....
   (A) K kg mol^{-1} or K $(molality)^{-1}$ (B) mol kg K^{-1} or K^{-1} (molality)
   (C) kg mol^{-1} K^{-1} or K^{-1} $(molality)^{-1}$ (D) K mol kg^{-1} or K (molality)
9. An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because .....
   (A) it gains water due to osmosis. (B) it loses water due to reverse osmosis.
   (C) it gains water due to reverse osmosis (D) it loses water due to osmosis
10. Which of the following cell is concentration cell ?
    (A) $Cu_{(s)} \,|\, Cu^{2+}_{(aq.0.5M)} \,||\, Cu^{2+}_{(aq.0.1M)} \,|\, Cu_{(s)}$ (B) $Zn_{(s)} \,|\, Zn^{2+}_{(aq.0.5M)} \,||\, Cu^{2+}_{(aq.0.1M)} \,|\, Cu_{(s)}$
    (C) $Cu_{(s)} \,|\, Cu^{2+}_{(aq.0.5M)} \,||\, Cu^{2+}_{(aq.0.1M)} \,|\, Cu_{(s)}$ (D) $^{\ominus}Pt \,|\, H_{2(g,\,1bar)} \,|\, HCl_{(aq.0.002M)} \,||\, H_{2(g,\,1bar)} \,|\, Pt^{\oplus}$
11. During electrolysis of dilute aqueous $CuSO_4$ solution by inert electrode, the pH of solution is .....
    (A) Decreases (B) Increases
    (C) Remains constant (D) Decreases after increases

12. Which products are obtained on anode and cathode respectively when electrolysis of concentrated NaCl solution is carried out using graphite as electrodes ?
(A) Cl_2 and H_2 (B) O_2 and Na (C) O_2 and H_2 (D) Cl_2 and Na

13. Give symbolic representation of following reaction :
$Mg_{(s)} + CO^{2+}{}_{(aq)} \rightleftharpoons Mg^{2+}{}_{(aq)} + Co_{(s)}$
(A) ${}^{\ominus}Co_{(s)} \,|\, Co^{2+}_{(1M)} \,||\, Mg^{2+}_{(g)} \,|\, Mg_{(s)}{}^{\oplus}$ (B) ${}^{\ominus}Co_{(s)} \,|\, Co^{2+}_{(1M)} \,||\, Mg_{(g)} \,|\, Mg_{(aq)(1M)}{}^{\oplus}$
(C) ${}^{\ominus}Mg_{(s)} \,|\, Mg^{2+}_{(1M)} \,||\, Co_{(aq)} \,|\, Co^{2+}_{(1M)}{}^{\oplus}$ (D) ${}^{\ominus}Mg_{(s)} \,|\, Mg^{2+}_{(1M)} \,||\, Co^{2+}_{(aq)} \,|\, Co_{(s)}{}^{\oplus}$

14. $X \xrightarrow{\text{Step-I}} Y \xrightarrow{\text{Step-II}} Z$ is a complex reaction. Total order of reaction is 2 and step-II is slow step. What is molecularity of Step-II ?
(A) 1 (B) 2 (C) 3 (D) 4

15. Reaction $3ClO^- \rightarrow ClO^-_3 + 2C1^-$ occurs in following two steps.
(i) $ClO^- + ClO^- \xrightarrow{K_1} ClO_2^- + Cl^-$ (Slow step)
(ii) $ClO_2^- + ClO^- \xrightarrow{K_2} ClO_3^- + Cl^-$ (Fast step)
then the rate of given reaction = ...
(A) $K_1[ClO^-]^2$ (B) $K_1\,[ClO^-]$ (C) $K_2[ClO^-_2]\,[ClO^-]$ (D) $K_2[ClO^-]^3$

16. How much time is required for completion of a zero order reaction ?
(A) $\frac{2[R_o]}{K}$ (B) $\frac{[R_o]}{2K}$ (C) $\frac{[R_o]}{K}$ (D) $\frac{K}{[R_o]}$

17. If dispersed phase is gas and dispersion medium is liquid then the type of colloid is ....
(A) Emulsion (B) Foam (C) Aerosol (D) Sol

18. In butter, which of the following are dispersed phase and dispersion medium respectively ?
(A) Solid and solid (B) Liquid and solid
(C) Solid and liquid (D) Liquid and liquid

19. At the same temperature and pressure, which of the following gas will be adsorped in more proportion ?
(A) Cl_2 (B) N_2 (C) H_2 (D) NH_3

20. Which of the following will have less value than zero during adsorption ?
(A) ΔG (B) ΔH
(C) ΔS (D) All the given three options

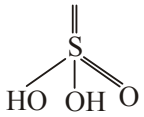
21. Heating pyrites in air to remove sulphur is known as.....
(A) Roasting (B) Calcination (C) Smelting (D) Bessemerisation

22. The mixture of which of the following is called "Matte" ?
(A) FeO and SiO_2 (B) PbS and ZnS (C) Cu_2S and FeS (D) Cu_2S and SO_2

23. What is the hybridisationof central atom in the product obtained along with hydrofluoric acid when complete hydrolysis of Xenon Hexa Fluoride takes place ?
(A) sp^3d^2 (B) sp^3d (C) sp^3 (D) dsp^3

24. In which of the following acid, the maximum number of hydrogen atoms are joined directly with phosphorous ?

(A) Phosphorous acid (B) Phosphonic acid (C) Pyro phosphoric acid (D) Phosphoric acid

25.  of which acid, this structure is ?

(A) Sulphurous acid (B) Sulphuric acid

(C) Dithionic acid (D) Thiosulphuric acid

26. Which of the following ion has the maximum theoretical magnetic moment ?

(A) Fe^{3+} (B) Cr^{3+} (C) Ti^{3+} (D) Co^{3+}

27. Which of the following mixture of metals can not form alloy ?

(A) Ni + Mg + Cr (B) Au + Cu + Cr (C) Fe + Cr + Cu (D) Ni + Cu + Cr

28. Which of the following complex does not show optical isomerism ?

(A) $[Cr(C_2O_4)_3]^{3-}$ (B) Cis $[Pt(Br)_2(en)_2]^{2+}$

(C) $[CrCl_2(NH_3)_2en]^{+}$ (D) $[Cr(NH_3)_4SO_4]^{+}$

29. Which of the following complex is para-magnetic ?

(A) $[Ni(CO)_4]$ (B) $[Co(NH_3)_6]^{3+}$ (C) $[Ni(CN)_4]^{2-}$ (D) $[NiCl_4]^{2-}$

30. Both [Ni(CO)4] and [Ni(CN)4]2- are diamagnetic. The types of hybridisation of Ni in these complexes are ..... and ..... respectively.

(A) sp^3, sp^3 (B) sp^3, dsp^2 (C) dsp^2, sp^3 (D) dsp^2, dsp^2

31. Which carbon - halogen bond has the lowest bond enthalpy ?

(A) C - Cl (B) C - Br (C) C - F (D) C - I

32. Which of the following is an example of a geminal Halide ?

(A) 1, 2-dichloropropane (B) 1, 4-dichlorobutane

(C) 2-chlorobutane (D) 1, 1-dichloropropane

33. Which of the following alkyl Halides when subjected to dehydro halogenation by the action of ethanoic KOH would yield $CH3 - CH = \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$?

(A) $CH_3 - CH(Br) - CH(CH_3)_2$ (B) $CH_3 - CH_2 - CH(Br) - CH_2CH_3$

(C) $CH_3 - CH_2 - CH(CH_3) - CH_2Br$ (D) $CH_3 - CH(Br) - (CH_2)_2 - CH_3$

34. The order of reactivity of following alcohols with halogen acids is .....

(A) $CH_3CH_2 - CH_2 - OH$ (B) $CH_3CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - OH$ (C) $CH_3CH_2 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - OH$

(A) (A) > (B) > (C) (B) (C) > (B) > (A) (C) (B) > (A) > (C) (D) (A) > (C) > (B)

35. Which of the following reagent reacts with but-1-ene to give optically inactive product ?
(A) Br_2/CCl_4 (B) HBr (C) H_2O/H^+ (D) $(BH_3)_2/H_2O_2(OH^-)$

36. Which is the final product obtained by the reaction of a Grignard reagent ethyl Magnesium bromide with propanone ?
(A) Pentane-1-ol (B) 2-Methylbutane-2-ol
(C) Pentane-2-ol (D) 3-Methylbutane-2-ol

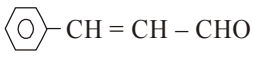
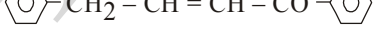
37. How many alcohols and ethers are possible with general formula $C_4H_{10}O$?
(A) 7 (B) 4 (C) 5 (D) 8

38. Which of the following is used as a solvent in oxidation of Alcohol by Pyridinium chloro chromate ?
(A) Chloro methane (B) Trichloro ethane (C) Trichloro methane (D) Dichloro methane

39. What is the correct order of reactivity of alcohols in the following reaction ?

$$R - OH + HCl \xrightarrow{ZnCl_2} R - Cl + H_2O$$

(A) $1^o > 2^o > 3^o$ (B) $1^o < 2^o > 3^o$ (C) $3^o > 2^o > 1^o$ (D) $3^o > 1^o > 2^o$

40. What is the main product obtained by the cross-aldol condensation of benzene carbaldehyde and 1-phenyl-ethane-1-one ?
(A)  (B) 
(C)  (D) 

41. Which of the following compound undergoes aldol condensation ?
(A) Formaldehyde (B) Trichloro acetaldehyde
(C) Trimethyl acetaldehyde (D) Acetaldehyde

42. $P \xrightarrow{KMnO_4/KOH} Q \xrightarrow[\Delta]{\text{Soda lime}} R \xrightarrow[Anhy{\cdot}AlCl_3]{CH_3Cl} S$ If P and S are toluene, Q & R are ..... and ..... respectively.
(A) Benzaldehyde, Benzoic acid (B) Benzaldehyde, Sodium benzoate
(C) Benzoic acid, Benzene (D) Benzene, Benzoic acid

43. Presently which reagent is used for separation of 1^o, 2^o and 3^o amines ?
(A) p-toluene sulphonyl chloride (B) p-Amino benzene sulphonyl chloride
(C) Benzene sulphonyl chloride (D) m-toluene sulphonyl chloride

44. In which of the following reactions the hybridisation of N atom is changed ?
(A) Ethyl amine $\xrightarrow{CH_3CH_3Cl}$ (B) Ethyl chloride $\xrightarrow[\Delta]{2NH_3}$
(C) Ethanamide $\xrightarrow[H_2O]{LiAlH_4}$ (D) Ethane nitrile $\xrightarrow{LiAlH_4}$

45. Which of the following compound does not react with Hinsberg reagent ?
(A) $(CH_3)_2NH$ (B) CH_3NH_2 (C) $(CH_3)_3N$ (D) None of the above

46. Which one is a purine base ?
(A) Uracil (B) Thymine (C) Cytosine (D) Guanine

47. Which of the following Dicarboxylic acid is obtained on oxidationof glucose by strong oxidising
(A) Oxalic acid (B) Malonic acid (C) Saccharic acid (D) Gluconic acid

48. Which of the following compound is trisaccharide ?
(A) Cellobiose (B) Reffinose (C) Stachyose (D) Lactose

49. Which of the following reaction not indicates the linear structure of Glucose ?

(A) $C_6H_{12}O_6 \xrightarrow{NaHSO_3}$ (B) $C_6H_{12}O_6 \xrightarrow[\text{Anhydrous } ZnCl_2]{(CH_3CO)_2O}$

(C) $C_6H_{12}O_6 \xrightarrow[\Delta]{HI}$ (D) $C_6H_{12}O_6 \xrightarrow{NH_2-NH-\langle O \rangle}$

50 In the reaction CH_3 - CH = CH - CH_2 - CH_2 - CN

$\xrightarrow[(i)\ H_2O]{(i)\ Al\ H(i\text{-}Bu)_2}$ A Identify the product

formed in the given reaction

(A) CH_3-$CH_2CH_2CH_2CH_2CN$ (B) CH_3-CH=CH-CH_2-CH_2CHO

(C) $CH_3CH2CH2CH_2CH_2CHO$ (D) CH_3-CH-CH-CH_2-CH_2-CN
| |
OH OH

PART-B

SECTION-A

⇒ **Answer the following questions in short**

1. Silver crystallizes in fcc lattice. If the edge length of the cell is 4.07×10^{-8}cm and density is 10.5 g cm^{-3}, calculate the atomic mass of silver.
2. Calculate the potential (emf) of the cell
$Cd/Cd^{+2}{}_{(0.10\ m)} \mid H^+{}_{(0.20\ m)} \mid H_{2(0.5\ atm)} \mid Pt$
[Given E^0 for $Cd^{+2}/Cd = -0.403V$, $R = 8.314\ JK^{-1}\ mol^{-1}$ $F = 96500$ C/mol]
3. Desive a relationship between half reaction time and rate constant of zero order reaction.
4. Explain roasting process.
5. Complete the following reactions.
(i) $2\ MnO_2 + 4KOH + O_2 \rightarrow$
(ii) $Fe^{+2} + MnO^-{}_4 + 8H^+ \rightarrow$
OR
5. Name the metal refined by each of the following processes.
6. Predict the products of the following reactions.
(i) $H_3CH_2CH_2OCH_3 + HI \rightarrow$
(ii) $[CH_3]_3\ C - OCH_3 + HI \rightarrow$
7. What are the essential and non-essential amino acids ? Give one example of each type.
OR
7. Write a short note on carbylamine reaction.
8. What product would be formed when a nucleotide from DNA containing thymine is hydrolysed ?

Section – B

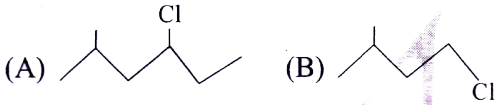
9. Explain the following :
(i) Metal excess defect due to anionic vacancies.
(ii) Metal deficiency defect.

10. How many spoons can be electroplated by silver when 5 ampere current is passed through electrolytic cell of $AGNO_3$ for 2.5 hours ? Efficiency of the cell is 80% and 0.01 gm Ag layer is deposited on each spoon. (Atomic mass = 108 gm/mole)

11. Define the following terms :
(i) Lyophilic colloid (ii) Zeta pootential (iii) Multimolecular colloids.

12. Explain on the basis of valence bond theory that $[NiCCN4]^{-2}$ ion with square planar structureis diamagnetic and $[Nicly]^{-2}$ ion with tetrahedral geometry is paramagnetic.

13. (i) Why aryl halides are less reactive towards nucleophilic substitution reactions than alkyl halides ?
(ii) Which of the following two substances undergo SN' reaction faster and why ?



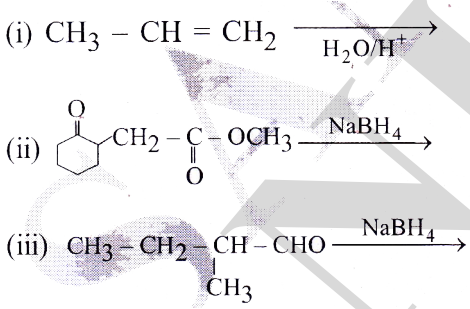
OR

13. How will you convert ethanal into the following compounds ?
(i) Butane -1, 3 - diol (ii) But -2-enal (iii) But -2-enoic acid

14. How will you convert
(i) Nitromethane into methanol
(ii) Ethanamide to N-methyl methanamine

OR

14. Draw the structure of the products of the following reactions.



Section – C

15. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate:
(i) Molar mass of the solute
(ii) vapour pressure of water at 298 K.

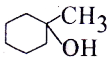
16. (a) The decomposition of phospline, PH_3 proceeds according to the following equation:
$4PH_3(g) \rightarrow Pu(g) + 6H_2(g)$
It is found that the reaction follows the following rate equation:
Rate = $K[PH_3]$ the half-life of PH_3 is 37.9s at 120° C.
(i) How much time is required for $3/4^{th}$ of PH_3 to decompose?
(ii) What fraction of the original sample of PH_3 remains behind after / minute?
(b) Define : order of reaction.
Justify that this reaction is a disproportionation reaction.

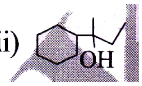
17. Write the hymidisation and magnetic character of the following complexes :
(i) Fe $CH_2O)_6]^{2+}$
(ii) K_4 [Ni$(CN)_4$]
(iii) $KMno_4$
(iv) Ni $(CO)_4$]

OR

17. Write the chemical equations to illustrate the following name reactions.
(i) Aldol condensation
(ii) Clemmenson reduction

18. Show now would you synthesis the following alcohols from appropriate alkenes ?

(i) 

(ii) 

★★★

Paper-3

(Chemstriy)

PART-A

⇒ **MCQ's** **[50]**

1. Which of the following is a network solid ?
   (A) SO_2 (Solid) (B) 1_2 (C) Diamond (D) H_2O (Ice)
2. Each carbon atom in diamond is sp^3 hybridized and are tetrahedrally bonded with four carbon atoms forming three dimensional network.
   Which of the following solids is not an electrical conductor ?
   (i) $Mg_{(s)}$ (ii) $TiO_{(s)}$ (iii) $I_{2(s)}$ (iv) $H_2O_{(s)}$
   (A) (i) only (B) (ii) Only (C) (iii) and (iv) (D) (ii), (iii) and (iv)
3. Cations are present in the interstitial sites in .....
   (A) Frenkel defect (B) Schottky defect
   (C) Vacancy defect (D) Metal deficiency defect
4. In which pair most efficient packing is present ?
   (A) hcp and bcc (B) hcp and ccp
   (C) bcc and ccp (D) bcc and simple cubic cell
5. If two liquids A and B form minimum boiling azeotrope at some specific composition then.....
   (A) A-B interactions are stronger than those btween A-A or B-B.
   (B) Vapour pressure of solution increases because more number of molecules of only one of the liquids escape from the solution.
   (C) Vapour pressure of solution decreases because less number of molecules of only one of the liquids escape from the solution.
   (D) A-B interactions are weaker than those between A-A or B-B.
6. KH value for Ar(g), CO2(g), HCHO(g) and CH4(g) are 40.39, 1.67, 1.83 x 10-5 and 0.413 respectively. Arrange these gases in the order of their increasing solubility.
   (A) HCHO < CH_4 < CO_2 < Ar (B) HCHO < CO_2 < CH_4 < Ar
   (C) Ar < CO_2 < CH_4 < HCHO (D) Ar < CH_4 < CO_2 < HCHO
7. The partial pressure ratio P2A : po8 for the two volatile liquid A and B and poA : poB = 1:2 and mole ratio is XA : XB = 1:2. What is the mole fraction of A ?
   (A) 0.33 (B) 0.25 (C) 0.20 (D) 0.52
8. The vapour pressure of benzene is 75 mm and that of toluene is 22 mm at 20°C tempreture. The solution prepared by mixing 78 gram benzene and 46 gram toluene then, what will be the partial pressure of benzene in the mixture ?
   (A) 25 (B) 50 (C) 100 (D) 75
9. The vapour pressure of mixture of ethanol and propanol is 290 mm at 300 K temp. If the vapour pressure of propanol is 200 mm at 300 K temp. and the mole fraction of ethanol is 0.6, then what will be the vapour pressure of ethanol at 300 K temp. ?
   (A) 350 mm (B) 300 mm (C) 700 mm (D) 360 mm
10. How much chlorineis obtained when 0.5 Faraday current is pass through aqueous solution of NaCl ?
    (Atomic weight of Cl = 35.5 gm/mol)
    (A) 71.0 gm (B) 35.5 gm (C) 142.0 gm (D) 17.75 gm

11. Which cell will measure standard electrode potential of copper electrode ?
(A) $Pt_{(s)} \mid H_{2(g,\ 01.\ bar)} \mid H^+_{(aq.\ 1M)} \parallel Cu^{2+}_{(aq.1M)} \mid Cu$
(B) $Pt_{(s)} \mid H_{2(g,\ 1\ bar)} \mid H^+_{(aq.\ 1M)} \parallel Cu^{2+}_{(aq.\ 2M)} \mid Cu$
(C) $Pt_{(s)} \mid H_{2(g,\ 1\ bar)} \mid H^+_{(aq.\ 1M)} \parallel Cu^{2+}_{(aq.\ 1M)} \mid Cu$
(D) $Pt_{(s)} \mid H_{2(g,\ 1\ bar)} \mid H^+_{(aq.\ 0.1M)} \parallel Cu^{2+}_{(aq,\ 1M)} \mid Cu$

12. The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called .....
(A) Cell potential (B) Cell emf (C) Potential difference (D) Cell voltage

13. An electrochemical cell can behave like an electrolytic cell when .....
(A) $E_{cell} = 0$ (B) $E_{cell} > E_{ext}$ (C) $E_{ext} > E_{cell}$ (D) $E_{cell} = E_{ext}$

14. The rate constant value for a reaction is $1.75 \times 10^2\ L^2\ mol^{-2}\ sec^{-1}$. The half life period $t_{1/2}$ a .....
(A) $[R_o]^{-2}$ (B) $[R_o]$ (C) $[R_o]^2$ (D) $[R_o]^{-1}$

15. Mention the unit of K for zero order reaction.
(A) mole $litre^{-1}$ $second^{-1}$ (B) $second^{-1}$
(C) $(mole/litre)^{-1}$ $second^{-1}$ (D) $(mole/litre)^{1-n}$ $second^{-1}$

16. $AB \rightarrow A + B$ is a zero order reaction, if $K = 4 \times 10^{-1}$ $molelitre^{-1}$ $second^{-1}$, then how much will be the production rate in mole $litre^{-1}$ $second^{-1}$ for A ?
(A) 2×10^{-1} (B) 4×10^{-1} (C) 1.6×10^{-3} (D) 2×10^{-2}

17. Which phenomenon will occur when water is added to anhydrous Calcium Chloride ?
(A) Absorption (B) Adsorption (C) Desorption (D) Sorption

18. Rubber is a ..... colloid.
(A) Lyophobic (B) Multi-molecular (C) Associated (D) Lyophilic

19. Give the correct order of coagulation values of given electrolytes for the coagulation of 1 litre As_2S_3 sol.
(i) $FeCl_3$ (ii) Na_2SO_4 (iii) $BaCl_2$
(A) (i) < (iii) < (ii) (B) (ii) < (i) < (iii) (C) (i) < (ii) < (iii) (D) (i) > (iii) > (ii)

20. Which of the following process does not occur at the interface of phases ?
(A) Crystallisation (B) Heterogeneous catalysis
(C) Homogeneous catalysis (D) Corrosion

21. By which method oxygen and nitrogen present in the form of impurities in Zirconium are removed ?
(A) Van Arkel (B) Roasting (C) Liquation (D) Distillation

22. Which method is not used for concentration of ores ?
(A) Magnetic seperation (B) Froth floatation
(C) Smelting (D) Hydraulic washing of complex

23. A + Oxygen $\rightarrow$ B $\rightleftharpoons$ C What are A, B and C ?
Brown Colouress
Paramagnetic diamagenetic
(A) A $\rightarrow$ NO; B $\rightarrow$ NO_2; C $\rightarrow$ N_2O_4 (B) A $\rightarrow$ N_2O; B $\rightarrow$ NO; C $\rightarrow$ NO_2
(C) A $\rightarrow$ NO; B $\rightarrow$ NO_2; C $\rightarrow$ N_2O_3 (D) A $\rightarrow$ N_2O; B $\rightarrow$ N2O4; C $\rightarrow$ N_2O_5

24. Which of the following compound has a square pyramidal structure ?
(A) XeO_3 (B) XeF_6 (C) $XeOF_4$ (D) XeF_4

25. Which is the real order of basicity of hydrides of elements of Group-15 ?
(A) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$ (B) $BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$
(C) $NH_3 > PH_3 > BiH_3 > AsH_3 > SbH_3$ (D) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$

26. Electronic configuration of a transition element X in (+3) oxidation state is $[Ar]3d^5$. What is its atomic number ?
(A) 25 (B) 26 (C) 27 (D) 24

27. When KMnO4 solution is added to oxalic acid solution, the decolourization is slow in the beginning but becomes instantaneous after some time because....
(A) CO_2 is formed as the product. (B) Reaction is exothermic
(C) MnO^-_4 catalyses the reaction (D) Mn^{2+} acts as autocatalyst.

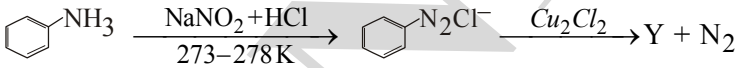
28. In which of the following complex geometrical as well as optical isomerism is observed ?
(A) $[Fe(OX)_3]^{3-}$ (B) $[Fe(NH_3)^2\ (en)_2]^{3+}$
(C) $[Fe(NH_3)_3\ (CN)_3]$ (D) $[Fe(NH_3)_2\ (CN)_4]^{1-}$

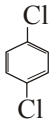
29. Which complex possess facial isomer ?
(A) $K[Fe(NH_3)_2(CN)_4]$ (B) $[Co(NH_3)_3(NO_2)_3]$
(C) $[Co(NH_3)_4CO_3]Cl$ (D) $(Ni(H_2O)_4(NH_3)_2]SO_4$

30. Indicate the complex ion which shows geometrical isomerism.
(A) $[Cr(H_2O)_4Cl_2]^+$ (B) $[Pt(NH_3)_3Cl]$ (C) $[Co(NH_3)_6]^{3+}$ (D) $[Co(CN)_5(NC)]^{3-}$

31. Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature ?
(A) $CH_3CH_2 - CH_2 - OH$
(B) $CH_3CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-OH$
(C) $CH_3CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2OH$
(D) $CH_3CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-OH$

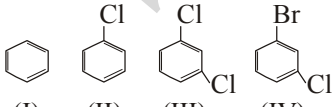
32. Identify the compound Y in the following reaction.



(A)  (B)  (C)  (D) 

33. Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is
(A) Electrophilic elimination reaction (B) Electrophilic substitution reaction
(C) Free radical addition reaction (D) Nucleophilic substitution reaction

34. Arrange the following compounds in the increasing order of their densities.

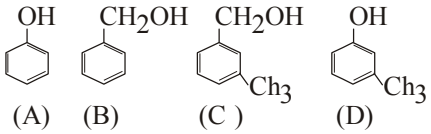


(I) (II) (III) (IV)

(A) (i) < (ii) < (iii) < (iv) (B) (i) < (iii) < (iv) < (ii)
(C) (iv) < (iii) < (ii) < (i) (D) (ii) < (iv) < (iii) < (i)

35. CH_3CH_2OH can be converted into CH_3CHO by .....
(A) Catalytic hydrogenation (B) Treatment with $LiAlH_4$
(C) Treatment with pyridinium chlorochromate (D) Treatment with $KMnO_4$

36. Which of the following compounds is aromatic alcohol ?



(A) (B) (C) (D)

(A) (A), (B), (C) and (D) (B) (A) and (D)
(C) (B) and (C) (D) (A)

37. The process of converting alkyl halide into alcohols involves .....
(A) Addition reaction (B) Substitution reaction
(C) Dehydrohalogenation reaction (D) Rearrangement reaction

38. IUPAC name of the compound : $CH_3 - \underset{\displaystyle CH_3}{\overset{|}{CH}} - OCH_3$
(A) 1-methoxy-1-methylethane (B) 2-methoxy-2-methylethane
(C) 2-methoxypropane (D) Isopropylmethyl ether

39. Which of the following compounds will react with sodium hydroxide solution in water ?
(A) C_6H_5OH (B) $C_6H_5CH_2OH$ (C) $(CH_3)_3COH$ (D) C_2H_5OH

40. How many π and σ bonds are present in product obtained by oxidation of p-xylene by $KMnO_4$/KOH and dil. H_2SO_4 ?
(A) 18, 5 (B) 16, 5 (C) 5, 18 (D) 5, 16

41. Which of the following order of acidic strength is correct for the following compounds ?

(A) iii < iv < ii < i (B) ii < iv < i < iii (C) ii < i < iv < iii **(D) iii < iv < i < ii**

42. Addition of water to alkynes occurs in acidic medium and in the presence of Hg^{2+} ions as a catalyst. Which of the following products will be formed on addition of water to but-1-yne under these conditions.

(A) $CH_3 - CH_2 - CH_2 - \overset{\displaystyle O}{\overset{\|}{C}} - H$ (B) $Ch_3 - CH_2 - \overset{\displaystyle O}{\overset{\|}{C}} - H$

(C) $CH_3 - CH_2 - CH_2 - \overset{\displaystyle O}{\overset{\|}{C}} - OH + Co_2$ (D) $CH_3 - \overset{\displaystyle O}{\overset{\|}{C}} - OH + H - \overset{\displaystyle O}{\overset{\|}{C}} - H$

43. Type of hybridization of N in electronic structure of amine is .....
(A) sp^2 (B) dsp^2 (C) sp^3 (D) sp

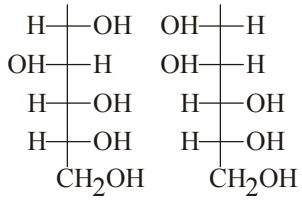
44. Which of the following cannot form Hydrogen bond with water ?
(A) Phenol (B) Alcohol (C) Carboxylic acid (D) Tertiary amine

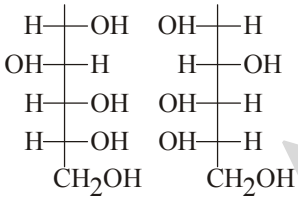
45. Which of the following compound can give carbyl amine reaction ?
(A) N,N-dimethyl aniline (B) Diphenyl amine (C) Benzyl amine (D) N-methyl benzenamine

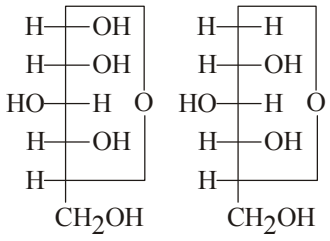
46. Which is different from others ?
(A) Glycogen (B) Dextrin (C) Cellulose (D) Stachyose

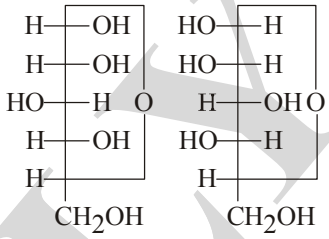
47. Which dicyclic base is present in RNA ?
(A) Guanine (B) Thymine (C) Cytosine (D) Uracil

48. Which of the following pairs represents anomers ?

(A) 

(B) 

(C) 

(D) 

49. Nucleic acids are the polymers of .....
(A) Nucleosides (B) Nucleotides (C) Bases (D) Sugars

50. Which of the following reagent is/are used in the given reaction ? R-CHO - RCOOH
(A) Nitric acid (B) $K_2Cr_2O_7/H_2SO_4$ (C) Tollen's reagent (D) All of the above

PART-B

SECTION : A

- Answer the following questions in short

1. Write differences between schottky defect and frenkel defect.
2. How many faradays of electric charge is required to liberale 5600 cm^3 of oxygen at STP ?
3. How can you determine the rate law of the following reaction ?
$2NO(g) + O_2(g) \rightarrow 2\ NO_2\ (g)$
4. Write the dispersed phase and dispersion medium of the following colloidal systems.
(i) Smoke (ii) Milk

OR

4. (i) Write the principle behind the method hydraulic washing.
(ii) Explain the principle on which the magnetic separation method work.
5. Draw the structures of the following.
(i) $XeFO_4$ (ii) $XeOF_4$
6. Write chemical equations for the reactions involved in the manufacture of potassium permanganate from pyrolusite one.
7. Conversion : 1, 2 – dibromo propane to propan-2-ol

OR

7. (i) Write the product when D-glucose reacts with cane HNO_3
(ii) Amino acids show amphoteric behaviour why ?
8. Explain dipeptide bond giving an example.

Section – B

Answer the following questions in detail

9. Alumnium crystallizes in a cubic close packed structure. Its metallic radius is 125 pm.
(i) What is the length of the side of the unit cell ?
(ii) How many unit cell are there in 1.00 cm^3 of aluminium ?

10. Write the Nernst equation of the following cells.
(i) pt / clz / xi^- // cl^- // cl2 // pt
P_1 x_1 x_2 P_2
(ii) Al / Al^{+3} // Br / Br_2 / pt
x_1 x_2 P

OR

10. (a) Heat of adsorption is greater for chemisorption than physisorption. Why ?
(b) What is colloidoin ?
(c) Which type of colloid is the fog ?

11. (i) What are interstitial compounds ?
(ii) Why do the transition elements form coloured compounds ? Explain.

12. Explain the following terms giving a suitable example in each case.
(i) Ambidentate ligand
(ii) Denticity of a ligand
(iii) Chelate formation.

13. Explain SN_2 reaction mechanism.

OR

13. How will you convert
(i) ethanoic acid into methanamine
(ii) Ethanaic acid into propanoic acid.

14. Name the reagent in the following reactions.
(i) Oxidation of primary alcohol to an aldehyde
(ii) Benzyl alcohol to benzoic acid
(iii) Dehydration of propan – 2-ol to propene.

Section – C

- Answer the following questions in detail

15. Two liquids X and Y on mixing from an ideal solution. 30ºC, the vapour pressure of the solution containing 3 mol of x and 1 mol of Y is 550 mmHg. But when 4 moles X and 1 mol of Y are mixed, the vapour pressure of solution, thus, formed is 560 mmHg. Hg what would be the vapour pressure of pure x and Y at this temperature ?

16. (a) A reaction is second order in A and first order in B.
(i) Write the differential rate equation.
(ii) How is the rate affected on increasing the concentration of A three times ?
(iii) How is the rate affected when the concentration of both A and B are doubled ?
(b) For first order reaction show that time required for 99% completion is twice the time required for the completion of 90% of the raction.

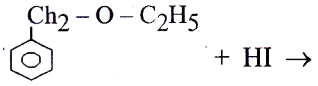
17. (i) What are the basic postulates of worner's theory of co-ordination ?
(ii) Draw structure compound

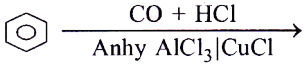
OR

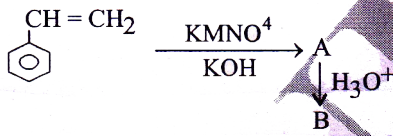
17. (i) An aliphatic compound 'A' with a molecular formula of C_3H_6O reacts with phenyl hydrazine to give compound 'A', 'B' and 'C'.
(ii) Write one chemical equation for each to illustrate the following reactions.
(a) Rose nmund reaction
(b) Hell-volhard-zelinsky reaction.

18. Complete the following reactions.

(i) $H-\underset{\underset{O}{\|}}{C}-H + CH_3MgBr \rightarrow A \xrightarrow{(i)H_2O/H^+} B$

(ii) 

(iii) 

(iv) 

★★★

Paper-4

(Chemstriy)

PART-A

⇒ **MCQ's** **[50]**

1. Which of the following oxides shows electrical properties like metals ?
   (A) SiO_2 (B) MgO (C) $SO_{2(s)}$ (D) CrO_2
2. Which of the following statement is not true about the hexagonal close packing ?
   (A) The coordination number is 12.
   (B) It has 74% packing efficiency.
   (C) Tetrahedral voids of the second layer are covered by the spheres of the third layer.
   (D) In this arrangement spheres of the fourth layer are exactly aligned with those of the first layer.
   In hcp, the spheres of first and third layers are in same alignment.
3. The correct order of the packing efficiency in different types of unit cells is .....
   (A) fcc < bcc < simple cubic (B) fcc > bcc > simple cubic
   (C) fcc < bcc > simple cubic (D) bcc < fcc > simple cubic
4. The edge lengths of the unit cells in terms of the radius of spheres constituting fcc, bcc and simple cubic unit cell are respectively .....
   (A) $2\sqrt{2r}, \frac{4r}{\sqrt{3}}, 2r$ (B) $\frac{4r}{\sqrt{3}}, 2\sqrt{2r}, 2r$ (C) $2r, 2\sqrt{2r}, \frac{4r}{\sqrt{3}}$ (D) $2r, \frac{4r}{\sqrt{3}}, 2\sqrt{2r}$
5. At 353 K, the vapour pressure of pure liquid A and B are 520 mm and 1000 mm respectively. If a mixture of solutions of A and B boils at 353 K and 1 bar pressure, the mole percent of A in mixture is ..... (1 bar = 760 mm)
   (A) 52 % (B) 34 % (C) 48 % (D) 50 %
6. Which one is not equal to zero for an ideal solution ?
   (A) ΔH_{mix} (B) ΔS_{mix} (C) ΔV_{mix} (D) $\Delta P = P_{observed} - P_{Raoult}$
7. At 100°C the vapour pressure of a solution of 6.5 gm of a solute in 100 g water is 732 mm. If Kb = 0.52, the boiling pointo f this solution will be :
   (A) 100°C (B) 102°C (C) 103°C (D) 101°C
8. The freezing point of benzene decreases by 0.45oC when 0.2 g of acetic acid is added to 20 g of benzene. If acetic acid associates to form a dimer in benzene, percentage association of acetic acid in benzene will be..... (Kf for benzene = 5.12 K kg mol-1)
   (A) 64.6 % (B) 80.4 % (C) 74.6 % (D) 94.6 %
9. If increase in boiling point of 1 molal glucose solution is 2K and increase in freezing point of 2 molal glucose solution is also 2K. Then state the relationship of Kb and Kf.
   (A) $K_b = 1.5\ K_f$ (B) $K_b = 0.5\ K_f$ (C) $K_b = 2K_f$ (D) $K_b = K_f$
10. The quantity of charge required to obtain one mole of aluminium from Al_2O3 is .....
    (A) 1F (B) 6F (C) 3F (D) 2F
11. In the electrolysis of aqueous sodium chloride solution which of the half-cell reaction will occur at anode ?
    (A) $Na^+_{(aq)} + e^- \rightarrow Na_{(s)}; E^\Theta_{cell} = -2.71V$ (B) $2H_2O_{(l)} + O_{2(g)} + 4H^+_{(aq)} + 4e^-; E^\Theta_{cell} = -1.23V$
    (C) $H^+_{(aq)} + e^- \rightarrow \frac{1}{2}H_{2(g)}; E^\Theta_{cell} = 0.00V$ (D) $Cl^-_{(aq)} + e^- \rightarrow \frac{1}{2}Cl_{2(g)} + e^- \; E^\Theta_{cell} = 1.36V$

12. What is emf of Pt | $H_{2(P1)}$ | $H^+_{(aq)}$ | | $H^+_{(aq)}$ | $H_{2(P2)}$ | Pt cell ?

(A) $\frac{RT}{F}\ln\frac{P_1}{P_2}$ (B) $\frac{RT}{2F}\ln\frac{P_2}{P_1}$ (C) $\frac{RT}{2F}\ln\frac{P_1}{P_2}$ (D) $\frac{RT}{F}\ln\frac{P_2}{P_1}$

13. Standard electrode potential of three metals x, y and z are - 1.2 V, + 0.5 V and -3.0 V. The order of reducing agent of three metals are.....

(A) y > z > x (B) y > x > z (C) z > x > y (D) x > y > z

14. What will be the theoretical rate of elementary reaction if pressure of O2 is increased by three times ?

$2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

(A) 27 times increase (B) 9 times increase

(C) 18 times increase (D) 3 times increase

15. For the given reaction, find the order of the reaction with respect to $[H^+]$

$5Br^-_{(aq)} + BrO^-_{3(aq)} \rightleftharpoons 3Br^-_{2(aq)} + 3H_2O_{(l)}$

(A) 3 (B) 2 (C) 1 (D) 4

16. The order of following reaction is .....

(A) 2 (B) 1 (C) 1.5 (D) 0

17. The term "sorption" stands for .....

(A) absorption (B) adsorption

(C) both absorption and adsorption (D) desorption

18. Extent of Physisorption of a gas increases with .....

(A) increase in temperature (B) decrease in temperature

(C) decrease in surface area of adsorbent (D) decrease in strength of van der Waals' force

19. Which of the following is not a favourable condition for physical adsorption ?

(A) High pressure (B) Negative AH

(C) Higher critical temperature of adsorbate (D) High temperature

20. On the basis of data given below predict which of the following gases shows least adsorption on a definite amount of charcoal ?

Gas	CO_2	SO_2	CH_4	H_2
Critical temp./K	304	630	190	33

(A) CO_2 (B) SO_2 (C) CH_4 (D) H_2

21. Which of the following acts as a reducing agent in Hall-Heroult process ?

(A) Na_3AlF_6 (B) CaF_2 (C) Graphite (D) Al_2O_3

22. By which substance silver is leached ?

(A) KCN (B) NaCN (C) Zn $(CN)_2$ (D) $[Zn(CN)_4]^{2-}$

23. Which catalyst is used in Ostwald's method ?

(A) Pt (20 %) + Rh (80 %) (B) Pt (80 %) + Rh (20 %)

(C) Pt (10 %) + Rh (90 %) (D) Pt (90 %) + Rh (10 %)

24. $(NH_4)_2\ Cr_2O_7 \xrightarrow{\Delta} N_{2(g)} + 4H_2O_{(l)} + X_{(s)}$ Mention the substance 'X' in this reaction.

(A) Cr_2O_3 (B) K_2CrO_4 (C) NH_3 (D) CrO_4

25. The oxidation state of phosphorus in phosphonic acid is

(A) + 5 (B) + 1 (C) + 3 (D) + 4

26. $KMnO_4$ acts as an oxidising agent in acidic medium. The number of moles of KMnO4 that will be needed to react with one mole of sulphide ions in acidic solution is .....

(A) $\frac{2}{5}$ (B) $\frac{3}{5}$ (C) $\frac{4}{5}$ (D) $\frac{1}{5}$

27. Why is HCl not used to make the medium acidic in oxidation reactionsof $KMnO_4$ in acidic medium ?

(A) Both HCl and $KMnO_4$ act as oxidising agents

(B) $KMnO_4$ oxidises HCl into Cl_2 which is also an oxidising agent.

(C) $KMnO_4$ is a weaker oxidising agent than HCl.

(D) $KMnO_4$ acts as a reducing agent in the presence of HCl.

28. The compounds $[CO(SO_4)(NH_3)_5]Br$ and $[CO(SO_4)\ (NH_3)_5]Cl$ represent

(A) Linkage isomerism (B) Ionisation isomerism

(C) Coordination isomerism (D) No isomerism

29. A chelating agent has two or more than two donor atoms to bind to a single metal ion. Which of the following is not a chelating agent ?

(A) $S_2O_3^{2-}$ (B) Oxalato (C) Glycinato (D) Ethane-1, 2-diamine

30. Which of the following species is not expected to be a ligand ?

(A) NO (B) BH^+_4 (C) $NH_2CH_2CH_2NH_2$ (D) CO

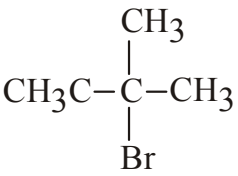
31. Which reagent will you use for the following reaction ?

$CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2Cl + CH_3CH_2CHClCH_3$

(A) Cl_2 / UV light (B) NaCl + H_2SO_4

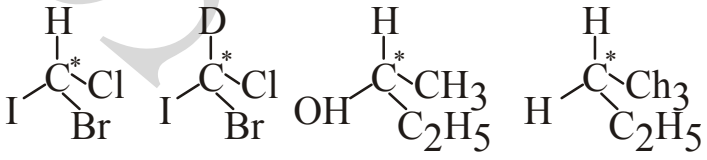
(C) Cl_2 gas in dark (D) Cl_2 gas in the presence of iron in dark

32. Arrange the following compounds in increasing order of their boiling points.

(i)  (ii) $CH_3CH_2CH_2CH_2Br$ (iii) 

(A) (ii) < (i) < (iii) (B) (i) < (ii) < (iii) (C) (iii) < (i) < (ii) (D) (iii) < (ii) < (i)

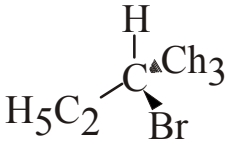
33. In which of the following molecules carbon atom marked with asterisk (*) is asymmetric ?

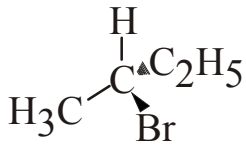
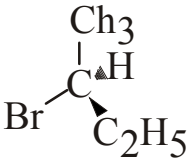
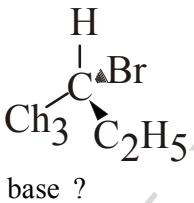
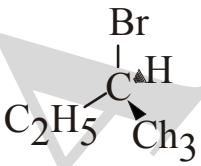


(i) (ii) (iii) (iv)

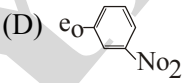
(A) (i), (ii), (iii), (iv) (B) (i), (ii), (iii) (C) (ii), (iii), (iv) (D) (i), (iii), (iv)

34. Which of the following structures is enantiomeric with the molecule (A) given below :



(A) 
(B) 
(C) 
(D) 

35. Which of the following species can act as the strongest base ?

(A) OH (B) OR (C) OC_6H_5 (D) 

36. Give the IUPAC name of the product obtained when phenol is oxidized by chromic acid (Na_2Cr_207 + Conc. H_2SO_4)

(A) Cyclohexa-2,5-diene-1, 4-dione (B) Cyclohexa-1, 4-dione
(C) Cyclohexanone (D) Cyclohexa-1, 4-diene-2, 5-dione

37. Substance A ..... isobutlyene, which is the structural formula of the substance A in thisreaction ?

(A) $CH_3CH_2CH_2CH_2 - OH$ (B) $CH_3CH(CH_3)CH_2OH$
(C) $CH_3CH(OH)CH_2CH_3$ (D) $(CH_3)_3C - OH$

38. Name the product obtained by the following reaction ?

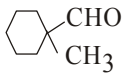
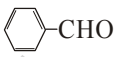
$CH_3 - CH_2 - CH_2 - CH = CH_2$ .....

(A) Pentan-3-ol (B) Pentan-2-ol (C) Pentan-1-ol (D) 2-methyl butan-2-ol

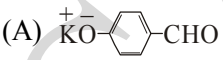
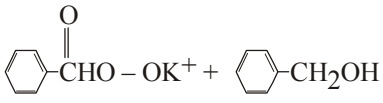
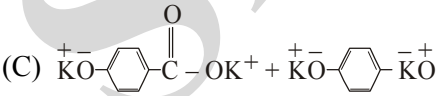
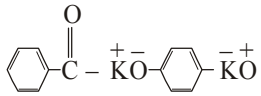
39. Which of the following alcohol is secondary (2^o) alcohol ?

(A) Isobutyl alcohol (B) Ethylene glycol (C) Neo pentanol (D) Iso propyl alcohol

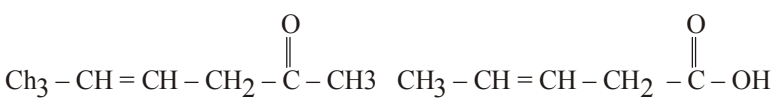
40. Cannizzaro's reaction is not given by .....

(A)  (B)  (C) HCHO (D) CH_3CHO

41. Which product is formed when the compound ..... CHO is treated with concentrated aqueous KOH solution ?

(A) 
(B) 
(C) 
(D) 

42. Which is the most suitable reagent for the following conversion ?



(A) Tollen's reagent (B) Benzoyl peroxide
(C) I2 and NaOH solution (D) Sn and NaOH solution

43. Which of the following is a 3° amine ?
(A) 1-methylcyclohexylamine (B) Triethylamine
(C) tert-butylamine (D) N-methylaniline

44. The correct IUPAC name for $CH_2 = CHCH_2NHCH_3$ is :
(A) Allylmethylamine (B) 2-amino-4-pentene
(C) 4-aminopent-1-ene (D) N-methylprop-2-en-1-amine

45. Amongst the following, the strongest base in aqueous medium is .....
(A) CH_3NH_2 (B) NC - CH_2NH_2 (C) $(CH_3)_2NH$ (D) C_6H_5 - NH - CH_3

46. Which of the following statements is not true about glucose ?
(A) It is an aldohexose (B) On heating with HI, it forms n-hexane
(C) It is present in furanose form (D) It does not give 2, 4-DNP test

47. DNA and RNA contain four bases each. Which of the following bases in not present in RNA ?
(A) Adenine (B) Uracil (C) Thymine (D) Cytosine

48. Which of the following reactions of glucose can be explained by its cyclic structure ?
(A) Glucose forms pentaacetate
(B) Glucose reacts with hydroxylamine to form an oxime
(C) Pentaacetate of glucose does not react with hydroxylamine
(D) Glucose is oxidized by nitric acid to gluconic acid

49. Hydrolysis of proteins give .....
(A) Peptide (B) α-Amino acid
(C) Enzyme (D) Amine and carbolylic acid

50 Which of the following is not a basic flux ?
(A) $CaCO_3$ (B) CaO (C) SiO_2 (D) MgO

PART-B

SECTION-A

1. A cubic solid is made up of two elements A and B. Atoms A are present at the corners of the cube and atoms B at the body centre. What is the formula of the compound ? What are the co-ordination numbers of A and B ?
2. What is electrolysis ? Give the reactions occurring at the two electrodes during electrolysis of dilute aqueous solution of sodium chloride ?
3. For a reaction $H_2 + Cl_2 \xrightarrow{hv} 2HCl$
Rate = K
(i) rite the order and molecularity of this reaction.
(ii) Write the unit of K.
4. Explain multimolecular colloids.
OR
4. What happens when zinc react with cone. HNO_3 and (b) dilu HNO_3.
5. Give reasons for the following :
(i) ransition metals generally form coloured compounds.
(ii) ransition metals and their many compound act as good catalyst.
6. Define : (i) Gangue (ii) Flux.
7. Describe the chemical test to distinquish between ethanol and phenol.
8. The two strands of DNA are not identical but are complementary Explain.

Section – B

9. A compound forms hexagonal close packed structure what is the total number of voids in 0.5 mol of it ? How many of these are tetrahedral voids ?

10. Calculate the emf of the following cell at 298 K.
$2Cr_{(s)} + 3\ Fe^{+2} \rightarrow 2Cr^{+3}{}_{(0.01M)} + 3\ Fe(s)$
Given $E^{o}_{cr^{+3}/cr} = -0.74$ volt, $E^{o}_{Fe^{+2}/Fe} = -0.44$ volt

11. (i) What happens when acidic $KMno_4$ is heated ?
(ii) transition metal forms alloys with other transition metals easily.

12. Write difference between a double salt and a complex compound.

13. Write the equations for the preparation of 1- iodobutane from.
(i) 1-butanol (ii) 1-chlorobutane. (iii) but-1-ene.

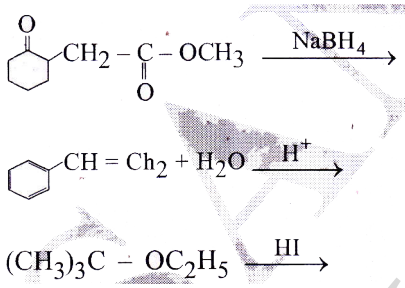
OR

13. Write the reactions involved in the following reactions.
(i) clemmensen reduction
(ii) cannizzaro reaction

14. Describe a method for the identification of primary, secondary and tertiary amines. Also write chemical equations of the reaction involved.

OR

14. Write the structures of the man products in the following reactions.



Section – C

15. At 90ºC, the vapour pressure of toluene is 400 mm and that of xylene is 150 mm. What is the composition of the liquid mixture that will boil at 90ºC when the pressure of mixture is 0.5 atm ?

16. (i) The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at a constant volume :
$SO_2Cl_2\ (g) \rightarrow SO_2(g) + Cl_2\ (g)$

Experiment	time/s	Total pressure
1	0	0.5
2	100	0.6

Calculate the rate of reaction when total pressure is 0.65 atm.
(ii) Define (i) Specific rate constant
(ii) molecularity

17. (i) Give reason : $[Co(NH_3)_6]^{+2}$ is less stable than $[Co(NH_3)_6]^{+3}$
(ii) Using IUPAC norms write the formulae for the following.
(a) Hexa – aquachromium (III) chloride
(b) ri-(ethane-1, 2-diamine) chromium (III) chloride

17. What is meant by the following terms ?
Give an example of the reaction in each case.
(i) Imine (ii) Ketal (iii) Semicarbazone

18. Give Reason : Preparation of ethers by acid dehydration of secondary or tertiary alcohols is not a suitable method.
(ii) Convert : Phenol to Acetophenone

Paper-5

(Chemstriy)

Section – A

1. Which crystalline solid is used as lubricant ?
   (a) I2 (b) Fullerene (c) KCL (d) Graphite
2. For which crytal syste, all four type for unit cell may exist?
   (a) Rhombohedral (b) Monoclinic (c) Trigonal (d) Othorhombic
3. Calcite is example of …… system.
   (a) Rhombohcdral (b) Monoclinic (c) Trigonal (d) Orthorhombic
4. 0.5 M glucose solution is iso-osmotic with which of the following solutions?
   (a) 0.10 M NaCl (b) 0.05 NaCl (c) 0.25 NaCl (d) 1 M Na
5. Pikup the correct formula of potash alum.
   (a) $K_2SO_4 . Al_2(SO_4)_3.25H_2O$ (b) $K_2SO_4. Al_2(SO_4)_2. 24H_2O$
   (c) $K_2SO_4. Al_2(SO_4)_3 . 12 H_2O$ (d) $K_2SO_4. Al(SO_4)_3. 12H_2O$
6. Which relation is true, if molecular weight of solute is x and its weight is y?
   (a) $x = \left(\frac{y}{v}\right)\frac{RT}{\pi}$ (b) $y = \left(\frac{x}{y}\right)\frac{RT}{\pi}$ (c) $x = \left(\frac{v}{y}\right)\frac{RT}{\pi}$ (d) $x = \left(\frac{y}{v}\right)\frac{R\pi}{T}$
7. Which of the following reaction is of Daniell cell?
   (a) $Zn_{(s)} + 2Ag^{+} \rightarrow Zn^{2+}_{(aq)} + 2Ag_{(s)}$ (b) $Cu_{(s)} + 2Ag^{+}_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)}$
   (c) $Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(g)} + Cu_{(s)}$ (d) $Zn_{(s)} + 2H^{+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + H_{2(g)}$
8. Stardard readuction potential of metals X, Y and Z are 0.34 V, 0.80 V and – 0.45 V then give their order of strength of veduction potential.
   (a) Z > Y > X (b) Z > X > Y (c) X > Y > Z (d) Y > Z > X
9. What is the correct Nernst formula to calculate potential of reaction $Zn^{+}_{(aq)} + 2e^{-} \rightarrow Zn_{(s)}$
   (a) $E_{Zn^{2+}|Zn} = E^{\Theta}_{Zn^{2+}|Zn} - \frac{0.059}{2}\log\left[Zn^{2+}_{(aq)}\right]$ (b) $E_{Zn^{2+}|Zn} = E^{\Theta}_{Zn^{2+}|Zn} - \frac{0.059}{2}\log\left[\frac{1}{Zn^{2+}_{(aq)}}\right]$
   (c) $E_{Zn^{2+}|Zn} = E^{\Theta}_{Zn^{2+}|Zn} + \frac{0.059}{2}\log\left[Zn^{2+}_{(aq)}\right]$ (d) $E_{Zn^{2+}|Zn} = E^{\Theta}_{Zn^{2+}|Zn} + \frac{0.059}{2}\log\left[\frac{1}{Zn^{2+}_{(aq)}}\right]$
10. What is the formla showing relation between Giff's free energy and cell potential?
    (a) $\Delta G = nFE^{\Theta}_{cell}$ (b) $\Delta G = \Delta H - T\Delta S$ (c) $\Delta G = -nFE^{\Theta}_{cell}$ (d) $\Delta G = -KFE^{\Theta}_{cell}$
11. If during a reaction, in presence of enzyme, heat is evoved or absorbed, then what change we can observe in it?
    (a) Increases (b) Decreases (c) Remain Constant (d) Cart judge
12. According to Arrherius equction, the slope of log K $\rightarrow \frac{1}{T}$ plot is .....
    (a) $\frac{-Ea}{2.303}$ (b) $\frac{-Ea}{2.303R}$ (c) $\frac{-Ea}{2.303RT}$ (d) $\frac{Ea}{2.303RT}$
13. Which of the following graph is correct for a first order rex^{n}?
    (a) Figure (b) (c) (d)
14. On oddition fo electrolyte colloidal particles get associated and from insolable precipitate then is known as …….
    (a) Floculation (b) Emulsification (c) Cogulation (d) Micelle
15. Which substance prepare colloidal sol in water?

(a) Salt (b) Glucose (c) Starch (d) $Ba(NO_3)_2$

16. Rubber is a …… colloid.
(a) Lyophobic (b) Multi – molecular (c) Associalted (d) Lyophilic

17. Which of the following is the Ore of Cu?
(a) Magnetite (b) Malachite (c) Calamine (d) Ciderite

18. Which Soluble complex is formed in the leading process of Gold?
(a) $[Au(OH)_2]$ (b) $[Au(CN)_4]^2$ (c) $[Au(OH)_4]^2$ (d) $[Au(CN)_2]$

19. The mixture of which of the following is called "Matte"?
(a) FeO And SiO_2 (b) PbS And ZnS (c) Cu_2S and FeS (d) Cu_2S And SO_2

20. What is the formula of salt prepared by the rex^n between NaOH and hypophosphorous acid.
(a) NaH_2PO_2 (b) Na_2HPO_2 (c) Na_3PO_2 (d) Na_3PO_3

21. What is the geometrical shape of XeO_3?
(a) Planar triangular (b) Trigonal pyramidal (c) Square planar (d) Tetrahydral

22. Which of the following is most basic?
(a) $Ce(OH)_3$ (b) $La(OH)_3$ (c) Al_2O_3 (d) $Ca(OH)_2$

23. Calculate magnetic moment of Fe^{+3} iors. (Fe = 26)
(a) 5.9 BM (b) 0.59 BM (c) 59 BM (d) 590 BM

24. Which of the following complex sp^3d^2 type hybridization?
(a) $[Fe(NH_3)_6]^{3+}$ (b) $[Fe(Cl)_6]^{3-}$ (c) $[Fe(CN)_6]^{3-}$ (d) $[Fe(CN)_6]^{4-}$

25. Both $[N(CO)_4]$ and $[Ni(CN)_4]$ are diamagnetic the types of hybridization of Ni in these complexes are …… and …….. respectively.
(a) sp^3, sp^3 (b) sp^3, dsp^3 (c) dsp^2, sp^3 (d) dsp^2, dsp^2

26. 1,2 – dichloro ethane is which type of halide?
(a) Gemiral halide (b) viciral halide (c) Alkylidese halide (d) Allylic halide

27. Which Carborn – halogen bord has the lowest bond erthalpy?
(a) C – Cl (b) C – Br (c) C – F (d) C – I

28. Which of the following compound is move acidic?
(a) $CH_3.OH$ (b) $CH_3 \cdot \underset{\underset{OH}{|}}{CH} \cdot CH_3$ (c) $CH_3.CH_2.CH_2.OH$ (d) $CH_3 \cdot \underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_3$

29. The following reaction is known as : - $C_6H_5OH \xrightarrow[Pyridine]{CH_3COCl} C_6H_5OCOCH_3$?
(a) Reimer – Tiemanr (b) Kolbe – Schmitt reaction (c) Acetylotion (d) Benzoylaiton

30. Glycerol is .....
(a) Primary alcohol (b) Secondary alcohol (c) Monolydirc acid (d) Trihydric alcohol

31. Which alcohol is obtained from water gas?
(a) Botarol (b) Metharol (c) Ethanol (d) None of these

32. What is the forula of Acrolein?
(a) $CH_2 = CH – CHO$ (b) $CH_2 = CH – CN$ (c) $CH_2 = CH – COOH$ (d) $CH_2 = CHCONH_2$

33. Which is the correct structural formula of Aspirin?
(a) Figure (b) (c) (d)

34. Which compound does not ordergo aldol condersation?
(a) Acetaldehyde (b) Mono chloro acetaddehye
(c) Dichloro acetaldehyde (d) Trichoro acetaldehyde

35. Which of the Following compoundhas highest boiling point?

(a) CH_3CH_2COOH (b) $CH_3 - CH_2 - \overset{\overset{O}{\|}}{C}\text{-}OH$

(c) $CH_3 - CH_2 - CH_2OH$ (d) $CH_3 - \overset{\overset{O}{\|}}{C}\text{-}CH_3$

36. What is the name of reagent (Figure)
(a) Tollen's Reagent (b) Grigrard reagent (c) Schiff reagent (d) Hinsbery reagent

37. Which of the following compound is known as alkyl carbyl amine?
(a) ArNC (b) Ar CN (c) RNC (d) RCN

38. What is the name of red azo dye?
(a) p – hydroxyl azobenzene (b) p – amino azobenzene
(c) β – naphtyl azobenzene (d) p – N, N – dimethyl amino azobenzene

39. Which of the following compound does not react with hinsberg reagent?
(a) $(CH_3)_2NH$ (b) CH_3NH_2 (c) $(CH_3)_3N$ (d) None of the above

40. Which is not true for glucose?
(a) $-CH_2OH$ group (b) –CHO group (c) four –CHOH group (d) ore C = O group

41. What is chemical name of Vitamin B_{12}?
(a) Pyridoxine (b) Cyanocobalamin (c) Ribaflavin (d) Thiamin

42. Which vitamin is not ablained from plants?
(a) Thiamine (b) Cyanocobalemine (c) Pyridoxine (d) α - Tacaphenal

43. Which are is a purine base?
(a) Uracil (b) Thymine (c) Cytosine (d) Guanine

44. Which Polymer is useful as a labricart?
(a)Orlon (b) Teflon (c) Dacron (d) Nylon

45. Which one is a monomer of Teflon?
(a) $CH_2 = C - CH = CH_2$ (b) $CH_2 = CH - CN$
(c) $CF_2 = CF_2$ (d) $CH_2 = CH - Cl$

46. Which polymer is used in the preparation of hose-pipe?
(a) Polystyrene (b) Neoprene (c) Teflon (d) Orlon

47. Which one is the antacid?
(a) Foracin (b) solphapiridine (c) NH_2CO_3 (d) Penicilline

48. Aspirin is which type of drug?
(a) Arhibiotics (b) Antacids (c) Analgesic (d) Antisephes

49. Solpha drugs are which type of drugs?
(a) Antimicrobials (b) Aralgesics (c) Artisephic (d) Antacids

50. Which of the following aqueous solutions will have maximum osmatic pressure at constant temperature?
(a) 1m $H_2SO_{4\,(aq)}$ (b) 1m $NaCl_{(aq)}$ (c) 1M $H_2SO_{4\,(aq)}$ (d) 1M $NaCl_{(aq)}$

Section – B

(1) Calculate the no of atoms per unit cell in primitive body certbved and face centred cubic unit cells.
(2) If 5.85 gm of NaCl is dissolved in 90 gm of water, then find out the mole fraction of NaCl.
(3) Write the redox reaction that occurs in Danietl cell.
(4) Write about elementrary and complex reactions. or
(4) Explain concertration of are by magnetic separation.
(5) Write a note on Dow's process.

(6) Discuss the anomalous behaviour of nitrogen.
(7) Write a note on interstitial compounds.
or
(7) Define the following terms- Homoleptic Heteroleptic complexes
(8) Give preparation of haloalkanes from hydrocorbans.

Section – C

(9) If N_2 gas is bubbled through water at 293k , how many millimoles fo N_2 gas would dissolve in 1 litre of water? Assume that N2 exerts a partial pressure of 0.987 box. Given that Henry's law constart for N2 at 293k is 76.48 K bar.
(10) Represent the cell in which the following reaction takes place,

$$Mg_{(s)} + 2Ag^{+}_{(0.0001M)} \rightarrow Mg^{2+}_{(0.130M)} + 2Ag_{(s)}$$

Calculate it's E_{cell} if $E^{\Theta}_{cell} = 3.17$ V

(11) Explain Electrophoresis or
(11) Write a note on S_N1 reation.
(12) Give preparation of phenol from benzene – solphoric acid and benzene diazonium chloride.
(13) Explain Gabriel phthalimeide synthesis.
(14) Wirte a note on sucrose. or
(14) Explain the lantharoid contraction.

Section – D

(15) During nuclear explosion one of the products is ^{90}Sr with half – life of 28. 1 years. If 1 mg of 90Sr was absorbed in the bones of a newly born instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.

(16) The hall – life for readioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80 % of the ^{14}C foond in a living tree. Estimate the age of the sample.

(17) Write a note on crystal field theary.
or
(17) Write about cross aldol condensation reaction.

(18) Write about (a) Tollen's Test (b) Fehling solution.

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Chemistry (English Medium) Answer Key

Paper-1

Answer Key

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

Paper-2

Answer Key

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

Paper-3

Answer Key

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

Paper-4

Answer Key

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

Paper-5

Answer Key

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

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Detail solution will be available on YouTube in one week
