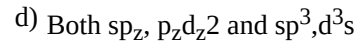
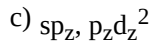
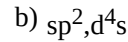
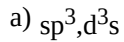
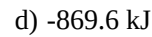
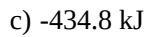
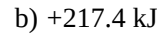
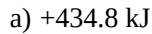


6. Which of the following sets of orbitals has/have same geometry? [4]

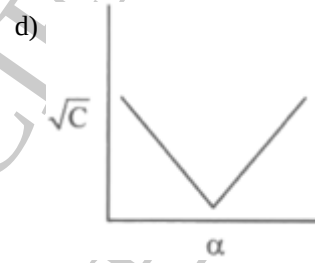
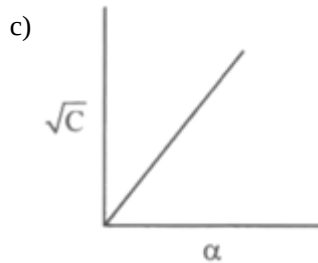
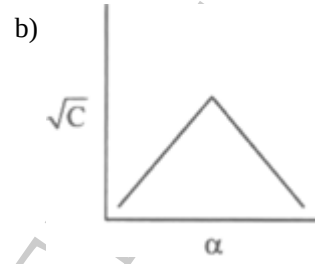
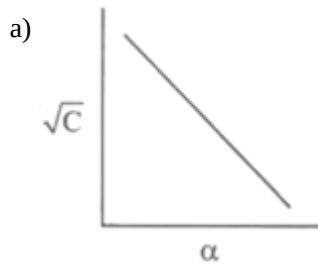


7. Enthalpy change for the reaction, $4H(g) \rightarrow 2H_2(g)$ is -869.6 kJ [4]

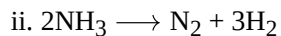
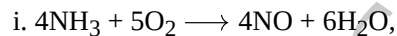
The dissociation energy of H - H bond is



8. Identify the CORRECT graph for a weak electrolyte. [4]



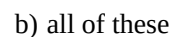
9. Equivalent masses of NH_3 in the reactions are: [4]



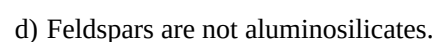
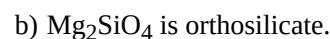
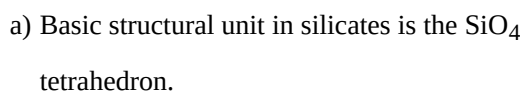
10. It is found that V forms a double salt isomorphous with Mohr's salt. The oxidation number of V in this compound is: [4]



11. $LiAlH_4$ violently decomposes in water to give: [4]



12. Which statement is wrong? [4]

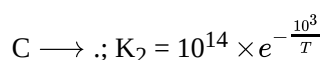
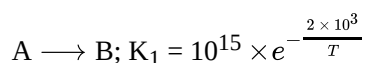


13. The order of stability of the following tautomeric compound is: [4]

c) normal energy of reactants

d) activation energy - normal energy of reactants

20. For two I order reaction: [4]



The temperature at which both have same rate if $[A] = [C]$ at $t = 0$:

a) 707.2 K

b) 707.2°C

c) 727°C

d) 434.2 K

21. Which of the following statements is incorrect? [4]

i. Actinoid series comprises a group of 14 elements from Th to Lr.

ii. Actinoids interrupt the fourth transition series of d-block elements.

iii. Actinoids are placed in group 3 and period 6 of the periodic table.

iv. In actinoids, the differentiating electron enters 5f orbital.

a) Option (ii)

b) Option (iv)

c) Option (i)

d) Option (iii)

22. Which has sp^2 -hybridization? [4]

a) CO

b) CO_2

c) SO_2

d) N_2O

23. Compound X, an orange coloured crystalline solid having Cr in its +6 oxidation state, is used in volumetric analysis. This compound X in presence of sulphuric acid oxidizes potassium iodide to form A, B, C and D. A and B are metal sulphates. D reacts with excess chlorine to form a yellow powder, E. However, an equimolar mixture of D and chlorine gives F. Compound E on hydrolysis gives F, iodic acid and hydrochloric acid. Based on the information, identify X, C, D, E, F respectively, and give the chemical formula of iodic acid. [4]

a) $X = K_2Cr_2O_7$, $C = H_2O$, $D = KIO_3$, $E = ICl_3$, $F = ICl$, Iodic acid = HIO_3

b) $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl$, $F = ICl_3$, Iodic acid = HIO_3

c) $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, $F = ICl$, Iodic acid = HOI

d) $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, $F = ICl$, Iodic acid = HIO_3

24. In the compound Lithium tetra-hydroaluminate, the ligand is [4]

a) H^-

b) H

c) H^+

d) F^-

25. Match the following: [4]

Coordination compounds	Coordination number
i. $[CoCl_2(en)_2]^+$	a. 6
ii. $[Ag(NH_3)_2]^+$	b. 5

iii. $[\text{Fe}(\text{CO})_5]$	c. 4
iv. $[\text{Pt}(\text{NH}_3)\text{BrCl}(\text{NO}_2)]$	d. 2

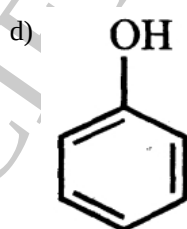
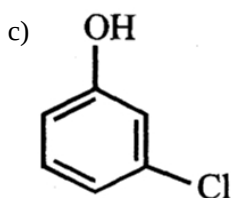
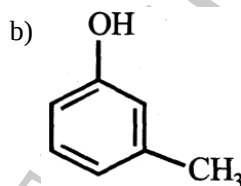
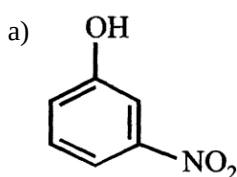
- a) i - b, ii - a, iii - c, iv - d
 b) i - a, ii - b, iii - d, iv - c
 c) i - a, ii - d, iii - b, iv - c
 d) i - d, ii - c, iii - a, iv - b

26. 2-Chlorobutan $\xrightarrow{15\% \text{ aq. solution of ethyl alcohol}}$ P [4]

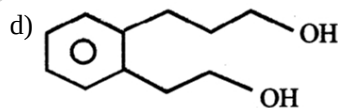
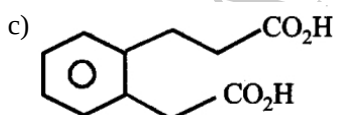
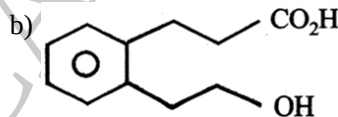
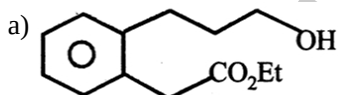
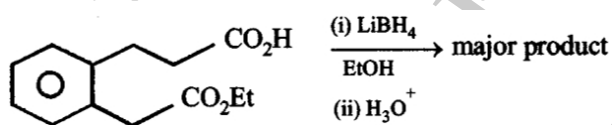
In this reaction 70% racemisation takes place. % of inverted product would be:

- a) 70
 b) 35
 c) 30
 d) 65

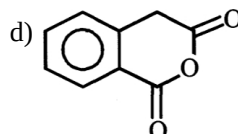
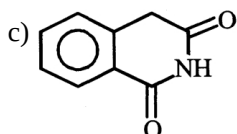
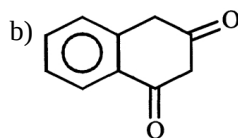
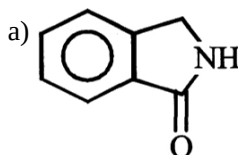
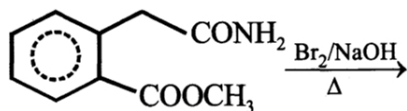
27. The strongest acid from the following is [4]



28. The major product formed in the following reaction is: [4]



29. The major product formed in the following reaction is [4]



30. Calorific value is in the order: [4]

- a) Fats > Carbohydrates > Proteins
 b) Fats > Proteins > Carbohydrates

- c) Proteins > Carbohydrates > Fats
d) Carbohydrates > Fats > Protein
31. The end product of protein digestion is: [4]
a) α - amino acids
b) protones
c) peptones
d) peptides
32. Find the correct sequence of intermediates formed during the conversion of p-nitrotoluene to p-nitroaniline. [4]
a) p-Nitroacetanilide, p-Bromoaniline, p-Nitrobenzoic acid
b) p-Bromoacetanilide, p-Bromoaniline, p-Nitrobenzoyl chloride
c) Benzenediazonium chloride, Benzyl alcohol, p-Nitrobenzaldehyde
d) p-Nitrobenzoic acid, p-Nitrobenzoyl chloride, p-Nitrobenzamide
33. $\Lambda_{m(NH_4OH)}^\circ$ is equal to: [4]
a) $\Lambda_{m(NaOH)}^\circ + \Lambda_{m(NaCl)}^\circ - \Lambda_{m(NH_4Cl)}^\circ$
b) $\Lambda_{m(NH_4Cl)}^\circ + \Lambda_{m(NaOH)}^\circ - \Lambda_{m(NaCl)}^\circ$
c) $\Lambda_{m(NH_4Cl)}^\circ + \Lambda_{m(NaCl)}^\circ - \Lambda_{m(NaOH)}^\circ$
d) $\Lambda_{m(NH_4OH)}^\circ + \Lambda_{m(NH_4Cl)}^\circ - \Lambda_{m(HCl)}^\circ$
34. Lassaigne's extract obtained from p-amino thiophenol on treatment with excess of sodium contain _____. [4]
a) only NaCN
b) only Na₂S
c) only NaSCN
d) NaCN and Na₂S
35. The concentration of oxalic acid is x mol litre⁻¹. 45 mL of this solution reacts with 20 mL of 0.05 M acidified KMnO₄. What is the pH of x M oxalic acid solution? [4]
(Assume that oxalic acid dissociates completely.)
a) 3.2
b) 2.5
c) 3
d) 1

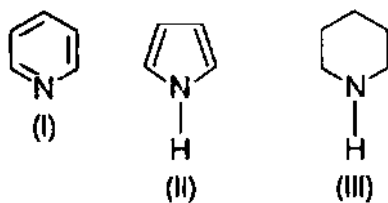
CHEMISTRY (Section-B)

Attempt any 10 questions

36. Which of the following statement is true for $IO_2 F_2^-$? [4]
i. The electrons are located at the corners of a trigonal bipyramidal but one of the equatorial pairs is unshared.
ii. It has sp³d hybridisation and is T-shaped.
iii. Its structure is analogous to SF₄.
iv. Both (i) and (iii)
a) (i)
b) (ii)
c) (iii)
d) Both (i) and (iii)
37. Which of the followings is an spectator ion in the reaction? [4]
 $2Na + 2HCl \longrightarrow 2NaCl + H_2$
a) H⁺
b) Na⁺
c) Cl⁻
d) H⁻
38. Aluminium dissolves in hot concentrated sulphuric acid, evolving a sulphur oxide 'X'. Oxidation state of S in this oxide is _____. [4]

- c) Potassium nitrate
d) Ammonium sulphate
47. In a familiar classroom demonstration, concentrated H_2SO_4 is added to a beaker containing sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$), to produce a column of carbon. In this reaction, the H_2SO_4 is acting primarily as a: [4]
- a) dehydrating agent
b) precipitating agent
c) complexing agent
d) oxidizing agent
48. The manganate and permanganate ions are tetrahedral, due to _____. [4]
- a) there is no π -bonding
b) the π -bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese
c) the π -bonding involves the overlap of p-orbitals of oxygen with p-orbitals of manganese
d) the π -bonding involves the overlap of d-orbitals of oxygen with d-orbitals of manganese
49. $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{NiCl}_4]^{2-}$ have similarity but not in: [4]
- a) C.N. and O.N.
b) magnetic moment
c) both magnetic moment and structure
d) structure

50. Arrange the following amines in the decreasing order of basicity: [4]



- a) III > II > I
b) III > I > II
c) I > II > III
d) I > III > II