

CHEMISTRY (THEORY)

MM. : 70

- 1) Attempt all the Question.
- 2) QNo.1-5 Carry One Marks each.
- 3) QNo. 6-12 Carry Two Marks each.
- 4) QNo. 13-24 Carry Three Marks each.
- 5) QNo. 25-27 are long answers question each carry five marks.
- 6) Use Log tables if necessary.
- 7) Attempt all parts of the same questions together.
- 8) QNo. must be written very clearly.

Q.1 Define ferroelectricity.

Q.2 State Raoult's law for solution containing Volatile solute.

Q.3 Write the unit of rate of constant of nth reaction.

Q.4 Write the IUPAC name of-



Q.5 Why Boric acid is used in Talcom powder.

Q.6 Define Radial Probability function plot a graph $4(\pi)r^2$ vs 'r' for '2S' Orbital.

Q.7 Calculate entropy of vapourisation ($\Delta_{\text{vap}} S^\circ$) If $\Delta_{\text{vap}} H^\circ$ is 42 KJ mol⁻¹ and B.P. of liquid is 127°C.

Q.8 Why E° for $\text{Mn}^{3+}|\text{Mn}^{2+}$ couple is more positive than that for $\text{Fe}^{3+}|\text{Fe}^{2+}$? {Atomic numbers: Mn (Z=25), Fe (Z=26)}

Q.9 Arrange the following as indicated.

a) $\text{NH}_3, \text{PH}_3, \text{AsH}_3, \text{SbH}_3$, increasing boiling point.

b) $\text{HOF}, \text{HOBr}, \text{HOI}, \text{HOCl}$ decreasing acid strength.

Q.10 Explain enantiomer and diastereomere.

Q.11 How will you bring about the following conversion.

a) Acetone to 2-methyl propane- 2-ol.

b) Benzene to Benzoic acid

Q.12 Explain the steps involved in polymerisation of vinyl. derivatives through free radical mechanism.

Q.13 A microscopic particle is moving with the velocity of the light and having 0.005% uncertainty in its velocity. What is the uncertainty in its position .if the mass of the particle is comparable to electronic mass

Q.14 Kf has NaCl structure. Calculate the distance between K^+ and F^- in Kf If the

density is 2.48 gm cm^{-3} (at. mass K=39, F=19 units)

Q.15 On dissolving 3.24 gm of sulphur in 20 gm of benzene the boiling point increase by 0.8 k. K_b for benzene is 2.53 k mol^{-1} . What is the molecular formula of sulphur.

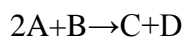
Q.16 Calculate the standard entropy change for a reaction, $X \rightleftharpoons Y$ if the value of $\Delta H^0 = 28.40 \text{ kJ}$ and equilibrium constant is 1.8×10^{-7} at 298K.

1. Q.17 The electrical resistance of a column of 0.05 M NaOH solution of diameter 2cm and length 100cm is 600 ohm, Calculate conductivity and molar conductivity.

OR

Conductivity of 0.00241 M acetic acid is $7.896 \times 10^{-5} \text{ S/cm}$. Calculate its dissociation constant if Λ^0 for acetic acid is $390.5 \text{ S cm}^2/\text{mol}$.

Q.18 The following results have been obtained during the kinetic studies of the reaction:



Experiment	[A]/M	[B]/M	Initial rate of formation of D/M min^{-1}
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law and the rate constant for the reaction.

Q.19 Write short note on the following :-

- Lyophobic and Lyophilic colloids
- peptisation.

Q.20 a) Define macrocyclic effect

- Define CFSE. Show splitting of d orbital for octahedral complex.
- Write down two points of stability of co-ordination complexes.

Q.21 a) How will you differentiate between breeder and nuclear reactor..

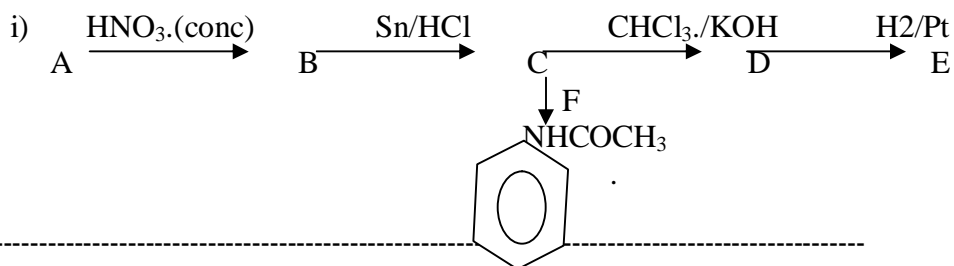
- What is meant by K-electron capture ?

Q.22 Give reasons-

- Oxidation of aldehyde is easier than ketone.
- Chloroacetic acid is more stronger acid than acetic acid.

Or

Identify A to F



Q.23 Explain the following with suitable example.

- a) Cannizzaro reaction. c) HVZ reaction.
- b) Gabriel phthalimide synthesis.

OR

How will you distinguish the following using chemical test,

- a) Ethanol and methanol.
- b) phenol and benzoic acid.
- c) Primary amine and secondary amine

Q.24 Describe the following with one example each.

- a) Azo dye c) Hybrid Rocket propellants
- b) Antihistamine

Q.25 a) What are silicones? How are they prepared. Mention the use of silicones.

- b) Write down chemical equation to prepare HClO_3 and F_2 .
- c) Draw the structure of XeOF_4 and H_3PO_4 .

OR

Q.25 a) Oxides of nitrogen are open while that of p are closed. Explain.

- b) Write down the prop. oxides of 14th group elements.
- c) Write down the chemical equation to prepare Cl_2 and I_2
- d) What are silicates? Write any one use.
- e) Draw the structure of $\text{H}_2\text{S}_2\text{O}_7$

Q.26

- a) What happens when-
 - i) KMnO_4 is heated with acidified Fe_2SO_4 .
 - ii) Alkaline KMnO_4 is treated with KI.
- b) Write the consequences of Lanthanoid contraction.
- c) Write the steps involved in the preparation of pot. dichromate from its ore.

OR

- a) Explain the following prop. of transition metals.
 - i) High enthalpy of atomization.
 - ii) Formation of complex compounds.
 - iii) Why actinides show large range of oxidation state than lanthanides.
- b) Explain the steps involved in the extraction of pot. permanganate from its ore.

Q.27

- a) Sequence of nitrogenous base in mRNA strand is AG CCU GUC write down the sequence of bases in DNA strand which acts as template for it.
 - b) Define anomer and epimer.
 - c) Explain denaturation and renaturation.
 - d) Define isoelectric point.
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