

2020-21
Time - 3 hours
Full Marks – 60

*Answer **all groups** as per instructions.
Figures in the right hand margin indicate marks.
Candidates are required to answer
in their own words as far as practicable.*

Group-A

1. Answer all questions or fill in the blanks as required. [1x8]
- a) Thermo chemistry is the study of relationship between heat energy and _____.
 - b) Standard enthalpies are measured at a temperature of _____.
 - c) The chemical equilibrium of a reversible reaction is not influenced by _____.
 - d) The pH of the buffer solution depends upon the concentration of _____.
 - e) K_{sp} is known as _____.
 - f) In electrophilic aromatic substitution reactions, the halides are described as _____.
 - g) _____ halides can give best SN^2 reaction.
 - h) Phenol reacts with $CHCl_3$ in presence of aq. NaOH to form _____.

Group-B

2. Answer any eight of the following questions within two or three sentences each. [1½x8]
- a) Write the expression in the form of a chemical equation for standard enthalpy of formation, ΔH^0 for CO.
 - b) Write the relationship between K_p and K_c .

- c) What happens to ΔG when equilibrium is attained?
- d) Write the expression for equilibrium constant K_p for the reaction:
- $$3\text{Fe}(s) + 4\text{H}_2\text{O}(g) \rightleftharpoons \text{Fe}_3\text{O}_4(s) + 4\text{H}_2(g)$$
- e) Write the relationship between ΔG and ΔG° .
- f) What is the relation between solubility and solubility product?
- g) What happens when phenol is distilled with zinc dust?
- h) Which aldehydes respond to iodoform test?
- i) Benzaldehyde does not undergo Aldol condensation whereas acetaldehyde does. Explain.
- j) Write the order of reactivity of the following compounds a CH_2CHO , $\text{CH}_3\text{CH}_2\text{COCH}_3$, CH_3COCH_3 .

GROUP-C

3. Write notes on any eight of the followings within 75 words: [2x8]
- a) Calculate the enthalpy of formation of ammonia from the following bond energy data:
- N-H bond=389 kJ/mole.
- H-H bond=435 kJ/mole and
- N=N bond=945.36 kJ/mole
- b) Define 1st law of thermodynamics.
- c) Define buffer solution and give an example of it.
- d) What is Reimer-Tiemann reaction?
- e) Write a test to distinguish between primary, secondary and tertiary alcohols.
- f) What is Clemmenson's reduction?
- g) What happens when formaldehyde reacts with conc. NaOH?
- h) Name the reaction and reagent used for the conversion of acid chloride to the corresponding aldehydes.

- i) What is Benzoin condensation?
- j) What happens when acetone reacts with HCN?

GROUP- D

4. Answer any four questions within 500 words each. [6x4]

- a) State and explain Le-Chateller's principle with examples.
- b) Write notes on :
 - I) Common ion effect
 - II) Solubility product
- c) How benzene is prepared in the laboratory? How does it react with
 - I) Chlorine
 - II) Methyl chloride
- d) How can you distinguish between primary, secondary and tertiary alcohols by oxidation method? Also write about Pinacol- Pinacolone rearrangement.
- e) How phenol can be prepared from:
 - I) Benzene diazonium chloride
 - II) Cumene

What happens when it reacts with conc. HNO_3 ?
- f) What happens when:
 - I) Acetaldehyde reacts with hydroxyl amine
 - II) Formaldehyde is treated with ammonia
 - III) Acetone is treated with I_2 and NaOH solution.
- g) Write notes on:
 - I) SN^1 reaction
 - II) Benzyne mechanics
