

Anjuman Islam Janjira Degree College of Science
Murud-Janjira, Raigad-402401
Affiliated to University of Mumbai

Class: -F.Y.B.Sc G.S	Subject: -Chemistry – I
Semester:- II	Course code: -USCH201
Exam Event:- Summer 2024 (FH)	Marks: -75
Date: - 16/04/2024	Duration: - 02:30 Hours

N.B:

1. All questions are compulsory.
2. **Figures** to the right indicate full marks.
3. Use of log-table/nonprogrammable calculator is allowed.
4. Answer for the same question as far as possible should be written together.

Q.1 Attempt any four of the following.

20

- A. Give the assumptions of Kinetic Theory of Gases.
- B. What is ideal gas law? Explain the different types of gas law.
- C. Give the difference between reversible and irreversible reactions.
- D. Derive an equation to show decrease in work function give maximum work that done by the system during the given change.
- E. Calculate the weight of oxygen necessary to fill up a cylinder of 5dm³ capacity at 300 K and 1.013 x 10⁷Nm⁻², if its compressibility factor is 0.96.
- F. The free energy change for a reaction at 300 K is 67 kJ, the enthalpy change is -42 kJ. Calculate the entropy change of the reaction. What will be the ΔG of the reaction at 350 K.

Q.2 Attempt any four of the following.

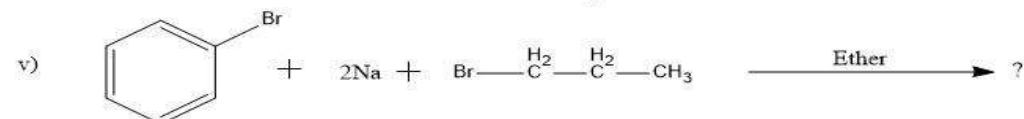
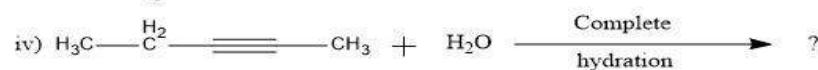
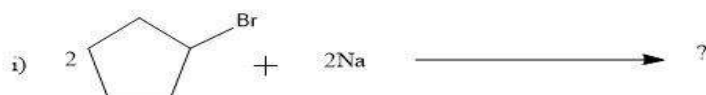
20

- A. Give and explain different types of qualitative analysis.
- B. How will you prepare the following reagent papers? Give its uses.
 i) Starch iodide paper ii) potassium dichromate paper iii) dimethyl glyoxime paper
- C. Calculate the solubility product of silver chromate given that 1 litre of a saturated solution at 298 K contains about 4.3 x 10⁻² g of the salt (Given: Molecular weight of Ag₂CrO₄ = 331.8)
- D. Explain Arrhenius concept of acids and bases and give its limitations.
- E. What is Lewis concept of acids and bases? Give and explain the types of Lewis acids.
- F. Explain HSAB concept and give its applications.

Q.3 Attempt any four of the following.

20

- A. Explain Wurtz and Wurtz-Fittig reaction for the preparation of alkanes.
- B. Explain Hofmann elimination reaction for preparation of alkenes with suitable example.
- C. Explain ozonolysis of alkenes with its mechanism.
- D. Define conjugated diene. Explain Diels- Alder reaction with its mechanism.
- E. What are alkynes? Explain acidic character of alkynes with suitable example.
- F. Complete the following reactions



Q.4A) Select the correct option and complete the following sentences. (any eight)**08**

- For one mole of the gas the ideal gas equation is
i) $PV=RT$ ii) $PV = \frac{1}{2} RT$ iii) $PV = \frac{3}{2} RT$
- The compressibility factor z is given by equation
i) $z= PV/ RT^2$ ii) $z= PV/nRT$ iii) $z= 2PV/ RT$
- Molar entropy is
i) Extensive property ii) intensive property iii) colligative property
- For a reaction to be spontaneous, ----- must be negative.
i) ΔH ii) ΔS iii) ΔG
- Ions with negative charges are called
i) cation ii) anions iii) neutral
- For the formation of precipitate of a particular substance its ionic product must be
i) greater than solubility product ii) less than solubility product
iii) equal to solubility product
- According to Lowry-Bronsted concept a substance that accept proton called
i) an acid ii) a base iii) a neutral substance
- H^+ is a
i) soft acid ii) hard base iii) hard acid
- The order of reactivity of halogens in halogenations of alkanes is
i) $F_2 > Cl_2 > Br_2 > I_2$ ii) $F_2 > Cl_2 > Br_2 < I_2$ iii) $F_2 < Cl_2 < Br_2 > I_2$
- Dehydrohalogenation is an ----- reaction.
i) Addition ii) insertion iii) elimination
- β -elimination is also called
i) 1,2 elimination ii) 1,3 elimination iii) 1,2 addition
- Terminal alkynes are -----in nature.
i) weakly acidic ii) weakly basic iii) strongly basic

B) State whether following sentences are True or False. (any three)**03**

- Above Boyle's temperature the value of PV increases continuously with increase in pressure.
- Entropy is a path function.
- NH_4OH is a weak electrolyte.
- According to Lewis concept a base is a proton donor.
- Alkanes undergo addition reactions.
- In alkynes carbon atoms are sp hybridised.

C) Match the following (Any Four)**04**

- | | |
|-----------------------------|--------------------------------------|
| i) Gibbs free energy Change | a) $\Delta G = \Delta S - T\Delta H$ |
| ii) Most probable velocity | b) 20% H_2SO_4 + 1% $HgSO_4$ |
| iii) Buffer solution | c) $\Delta G = \Delta H + T\Delta S$ |
| iv) $AlCl_3$ | d) $U = \sqrt{2RT/M}$ |
| v) Halogenation | e) Free radical chain reaction |
| vi) Hydration of alkynes | f) Maintain constant pH |
| | g) Lewis acid |
| | h) Lewis base |