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**SUBJECT CODE NO: - YY-2373**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**B.Sc. (CBCGS) (Pattern 2022) F.Y SEM II**  
**Examination April / May - 2024**  
**Chemistry Paper-IV Physical Chemistry**

[Time: 1:30 Hours]

[Max. Marks: 40]

Please check whether you have got the right question paper.

N. B

- 1) All questions are compulsory.
- 2) All questions carry equal marks.



Q.1 Explain in detail Carnot cycle.

OR

Explain in brief

- a) Give the applications of Hess's law.
- b) Explain effect of Change of pressure on equilibrium state of reaction.

Q.2 Deduce Graham's law of diffusion and Avogadro's hypothesis from kinetic gas equation.

OR

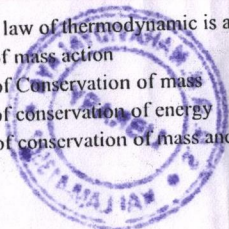
- a) Derive equation for rate constant for zero order reaction
- b) In a first order reaction, after 40 seconds, 2.5 moles of the reactant was found to be converted to product. Calculate rate constant of the reaction.  
(Given - Initial concentration of the reactant = 4 moles)

Q.3 Write short Notes on (Any Two)

- a) Intensive and Extensive properties
- b) P-v isotherms of real gases.
- c) Characteristics of Second order reaction.
- d) Entropy and Enthalpy.

Q.4 Multiple choice questions:-

- 1) According to law of mass action, the rate of reaction is directly proportional to
  - a) Volume of the container
  - b) Equilibrium constant
  - c) Nature of reactants
  - d) Molar concentration of reactants
- 2) The first law of thermodynamic is also known as
  - a) Law of mass action
  - b) Law of Conservation of mass
  - c) Law of conservation of energy
  - d) Law of conservation of mass and energy



- 3) A well stoppered thermos flask contains some ice cubes. This is an example of
- Isolated system
  - Closed system
  - Open system
  - Heterogeneous system
- 4) The heat engine which demonstrates a maximum convertibility of heat into work is known as
- Hess's cycle
  - Carnot's cycle
  - Clausius cycle
  - Gibb's cycle
- 5) Rate of reaction
- Decrease with increase in temperature
  - Increase with increase in temperature
  - May increase or decrease
  - Does not depend on temperature
- 6) The rate constant of zero-order reactions has the unit
- $\text{S}^{-1}$
  - $\text{Lmol}^{-1} \text{S}^{-1}$
  - $\text{L}^2 \text{mol}^{-2} \text{S}^{-1}$
  - $\text{mol L}^{-1} \text{S}^{-1}$
- 7) According to Charles's Law
- $P \propto T$
  - $C \propto T$
  - $V \propto T$
  - $T \propto V$
- 8) The state in which rate of forward and backward reaction is equal, is termed as
- Dissociation state
  - Equilibrium state
  - Spontaneous state
  - None of the above
- 9) In pseudo unimolecular reactions,
- Both reactants are present in low concentration
  - Both reactants are present in the same concentration
  - One reactant is non-reactive
  - One reactant is present in excess
- 10) At constant temperature, the product pressure and volume of a given amount of a gas is constant, this is \_\_\_\_\_
- Boyle's law
  - Gay-Lussac law
  - Charles's Law
  - None of these

