

Please check whether you have got the right question paper.

- N.B:
1. Attempt all questions.
 2. All questions carry equal marks.
 3. Draw neat labelled diagrams wherever necessary.
 4. Use of log tables and non-programmable calculator is allowed

Q.1 Do as directed: (Any Fifteen)

15

- 1) State the second law of thermodynamics.
- 2) What is absolute zero temperature?
- 3) What is the SI unit of measuring enthalpy?
- 4) The amount of heat required to raise the temperature of 1 kg of water through 1°C is called _____.
- 5) State true or false :- Temperature, pressure, and concentrations of reactants affect rate of the reaction.
- 6) State true or false :- Order of the reaction does not depends on concentration of reactants.
- 7) Give one example of a second order reaction.
- 8) Balance the following reaction:

$$I_2 + HNO_3 \rightarrow HIO_3 + NO_2 + H_2O$$

Complete the following reactions:

- 9) $Br_2 + H_2S \rightarrow$
- 10) $CuO + H_2 \rightarrow$
- 11) $Mg + Cl_2 \rightarrow$

Define the following:

- 12) Molecularity of a reaction
- 13) Chemical kinetics
- 14) Deelectronation
- 15) Redox reactions
- 16) Ion electron method

Name the following:

- 17) A change in a system, in which the temperature remains constant: $\Delta T = 0$.
- 18) A chemical reaction in which the reactants and products are in the same phase.
- 19) An element or compound that loses (or "donates") an electron to another chemical species in a redox reaction.
- 20) A transient species within a multi-step reaction mechanism that is produced in the preceding step and consumed in a subsequent step to ultimately generate the final reaction product.

(TURN OVER)

- Q.2 a) What is the first law of thermodynamics? Discuss its limitations 08
- b) Discuss the expansion of an ideal gas and the changes in its thermodynamic equilibrium. 07
- OR
- c) What are state functions? What are they dependent on? Discuss with examples. 08
- d) Explain an open system. Discuss with examples biochemical systems. 07
- Q.3 a) Derive half-time equation for a second order reaction and comment on their relationship. 08
- b) Define rate constant of a reaction and explain its characteristics. 07
- OR
- c) Explain first order reaction with one example. 08
- d) A second order reaction is started with 0.05 mol dm^{-3} concentration of both the reactants. If the reaction is 40% complete in 10 minutes then calculate the time taken for completion of 80% reaction. 07
- Q.4 a) What is the role of a reducing agent in a chemical reaction? Explain using suitable reactions. 08
- b) Comment the statement - oxidation and reduction reactions always proceeds side by side. 07
- OR
- c) Compute the oxidation number of C in CH_2O , Ni in $\text{Ni}(\text{CO})_4$ and Pt in $[\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3]$ 08
- d) Show that the formation of sodium chloride from gaseous sodium and gaseous chlorine is a redox reaction 07
- Q.5 **Write a short note on: (Any Three)** 15
- a) Entropy changes in an isobaric process.
- b) Specific Reaction Rate
- c) Order of Reaction
- d) Determination of oxidation state using permanganate ions
- e) Oxidizing agents with examples