Q.P. Code :03842

[Time: 2 $\frac{1}{2}$ Hours] **[Marks:75]**

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 halftime 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 $Ni(CO)_4$ and Pt in $[Pt(C_2H_4)Cl_3]$ **08**

d) Show that the formation of sodium chloride from gaseous sodium and gaseous chloride 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