

1. Attempt all questions.
2. All questions carry equal marks.
3. Draw neat labeled diagrams wherever necessary.
4. Use of log tables and non-programmable calculator is allowed.
5. For Q.2, Q.3 and Q.4 attempt A and B OR C and D.

Q.1 Do as directed (Any fifteen)

Define the following terms

1. Irreversible process.
2. Order of the reaction.
3. Bimolecular reaction.
4. Redox reaction.
5. Ion.

Fill in the blanks

6. An _____ process is where a system exchanges no heat with its surroundings.
7. In thermodynamics, S represents _____.
8. Minus sign in rate of reaction equation indicates that the concentration of the reactant _____ with time.

Balance the equation

9. $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- \rightarrow \text{Cr}^{3+} + \text{IO}_3^-$
10. $\text{NO}_3^- + \text{I}_2 \rightarrow \text{IO}_3^- + \text{NO}_2$

State True or False

11. Zero Kelvin is the same as -300 degrees Celsius.
12. An isobaric process happens without change in pressure.
13. Unit of specific reaction rate for first order and second order reactions is same.
14. Rate of the pseudo first order reaction depends on the concentration of two reactants.
15. Oxidation is a gain of electrons.

Give one word for the following

16. A system which exchanges matter and energy with the surroundings.
17. A gas that follows all the gas laws.
18. A chemical reaction in which reactants involved are in more than one phase.
19. A molecule that gains electrons.
20. A molecule that loses electrons.

- Q. 2 A Explain the second law of thermodynamics and state its limitations. 08
 Q. 2 B Differentiate between a closed and an isolated system with the help of examples. 07

OR

- Q. 2 C Explain the work done under reversible and isothermal conditions. 08
 Q. 2 D What is the law of conservation of energy? In an experiment 400 kJ heat is absorbed by the system so that its internal energy increases by 250 kJ. Calculate the work done by the system. 07

- Q. 3 A The half time for a first order reaction is independent of the initial concentrations of the reactant. Justify. 08
 Q. 3 B Explain second order reaction with an example. 07

OR

- Q. 3 C Discuss the kinetic characteristics of first order reaction. 08
 Q. 3 D A second order reaction with an equal concentration of the reactants is 60% complete in 2 hours. Calculate specific reaction rate. 07

- Q. 4 A Differentiate between oxidation and reduction reactions giving suitable examples. 08
 Q. 4 B What are addition reactions? Explain using suitable examples. 07

OR

- Q. 4 C State the rules to assign oxidation states to atoms using suitable examples. 08
 Q. 4 D Compare and contrast between elimination reactions and substitution reactions. 07

- Q. 5 Write Short notes on any three of the following 15
 a. Internal energy and its significance.
 b. Carnot's cycle.
 c. Graphical method for determining rate of the reaction.
 d. Oxidising agents.
 e. Ion electron method of balancing equations.