

SEMESTER-TWO

CHEMISTRY

Class XI

Sample Paper—2

Max. Marks: 50

Time Allowed: 90 minutes

General Instructions:

- (i) This question paper consists of 40 questions in 4 sections.
- (ii) Section A consists of 10 Objective type questions carrying 1 mark each.
- (iii) Section B consists of 10 Fill in the blanks type questions carrying 1 mark each.
- (iv) Section C consists of 10 True or False statement type questions carrying 1 mark each.
- (v) Section D consists of 10 Short answer and Numerical type questions carrying 2 marks each.

Section A

Select and write one most appropriate option out of the four options given for each of the questions 1–10.

1. Which of the following is the strongest reducing agent?
(a) Cr^{3+} (b) Cl^-
(c) Cr (d) Mn
2. Identify the correct statement
(a) Corrosion of iron can be minimized by forming an impermeable barrier at its surface
(b) Iron corrodes in oxygen free water
(c) Iron corrodes more rapidly in salt water because its electrochemical potential is higher.
(d) Corrosion of iron can be minimized by forming a contact with another metal with higher reduction potential.

3. For a reversible reaction,
 $A(s) + B(g) \rightleftharpoons C(g) + D(g)$; $\Delta G = - 350 \text{ kJ}$
Which one of the following statement is true?
(a) The entropy change is negative
(b) The equilibrium constant is greater than zero
(c) The reaction should be instantaneous
(d) The reaction is thermodynamically not feasible.
4. Based on First law of thermodynamics which one of the following is correct?
(a) For an isochoric process, $\Delta U = - q$
(b) For an adiabatic process, $\Delta U = - w$
(c) For an isothermal process, $q = + w$
(d) For a cyclic process, $q = - w$.
5. The fusion reaction in the sun is a multi-step process in which the
(a) helium is burned into deuterons.
(b) helium is burned into hydrogen.
(c) deuteron is burned into hydrogen.
(d) hydrogen is burned into helium.
6. During β -emission
(a) a neutron in the nucleus decays emitting an electron.
(b) an atomic electron is ejected.
(c) an electron already present within the nucleus is ejected.
(d) a part of the binding energy of the nucleus is converted into an electron.
7. Which of the following is not a general characteristic of equilibria involving physical processes?
(a) All the physical processes stop at equilibrium.
(b) Equilibrium is possible only in a closed system at a given temperature.
(c) All measurable properties of the system become constant.
(d) The opposing processes occur at the same rate.
8. The units of equilibrium constant for the reaction
$$N_2 + 3H_2 \rightleftharpoons 2NH_3 + \text{heat},$$
will be
(a) $\text{mol}^{-2} \text{L}^2$ (b) mol L^{-1}
(c) $\text{mol}^2 \text{L}^{-2}$ (d) L mol^{-1} .

9. The addition of a catalyst to a reaction provides an alternative mechanism with
- (a) lower activation energy and lower reaction rate
 - (b) lower activation energy and higher reaction rate
 - (c) higher activation energy and lower reaction rate
 - (d) higher activation energy and higher reaction rate
10. To have successful collisions the reactants must have
- (a) favourable geometry only
 - (b) sufficient heat of reaction only
 - (c) sufficient potential energy only
 - (d) sufficient kinetic energy and favorable geometry

Section B

Fill in the blanks with a suitable word for each of the questions 11–20.

11. The amount of heat produced in the combustion of a 1 gram of a fuel is called
12. A fuel having larger value of enthalpy of combustion have larger calorific value.
13. For a certain equilibrium reaction $K_p = K_c$. It indicates the equilibrium is pressure variation.
14. With increase in concentrations of the reactants, the value of equilibrium constant
15. Standard cell voltage should be for the cell to work.
16. In mercury cell the electrolyte used is
17. The electrolytic reaction is in nature.
18. Painting the iron surface to protect it from rust is called
19. If the activation energy of the reaction is low, it proceeds at rate.
20. The reaction taking place under the influence of visible light is called reaction.

Section C

State whether the following statements are true or false for each of the questions 21–30.

21. Every redox reaction can be split up into two half reactions, one representing loss of electrons i.e., reduction half reaction.
22. Daniel cells are used to generate electricity and to store electricity.
23. In galvanic cell, cathode is negative and anode is positive.

24. A device that converts chemical energy into electrical energy is called electrolysis.
25. The rays which deflected slightly towards negative plate were named as alpha rays.
26. The arrangement of various elements in the order of decreasing values of standard reduction potentials is called electrochemical series.
27. Internal energy change measures the heat of a reaction occurring at constant temperature and pressure.
28. The energy of products in exothermic reaction is more than that of reactants.
29. Calorific value and enthalpy of combustion of a fuel are same.
30. The enthalpy of formation of $\text{HCl}(\text{aq})$ is given by the equation $\text{HCl}(\text{g}) + \text{aq} \longrightarrow \text{HCl}(\text{aq}); \Delta\text{H} = -x \text{ kJ}$.

Section D

Answer each of the questions 31–40.

31. Differentiate between electrochemical cell and electrolytic cell.
32. Which thermodynamic parameters are taken to be zero at reference state of elements?
33. Write down the radioactive rays in the order of increasing penetrating power.
34. What is meant by concentration quotient of chemical reaction? Under what conditions, it is equal to equilibria constant?
35. Define order of a reaction.
36. Heat produced by combustion of 1.0 g of benzene (C_2H_6) at constant volume is 41.80 kJ at 298 K. Calculate the value of enthalpy of combustion of benzene at 29 K.
37. Explain with the help of a nuclear reaction in each of the following cases. How the neutron to proton ratio changes during (i) alpha decay (ii) beta decay.
38. A gaseous reaction $e + f \rightleftharpoons g$ at 373 K, the partial pressure of e, f, g at equilibrium are 0.30 atm and 0.60 atm respectively. Calculate K_p and K_c for the reaction.
39. Rate of formation of nitric oxide (NO) in the following reaction is $3.6 \times 10^{-3} \text{ mol}^{-1} \text{ s}^{-1}$.
$$4\text{NH}_3(\text{g}) + \text{SO}_2(\text{g}) \rightarrow 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$$
Find the rate of disappearance of oxygen.
40. Calculate the overall order of the reaction which has the rate expression.
 - (a) $\text{Rate} = k[\text{A}]^{1/2} [\text{B}]^{3/2}$
 - (b) $\text{Rate} = k[\text{A}]^{3/2} [\text{B}]^{-1}$