SAMPLE PAPER - II
SUB : CHEMISTRY
CLASS - XI

Time Allowed: 1 hr **Maximum Marks : 70**

General Instructions:

- All question are compulsory
- Q 1 to 20 are very short answer objective type and each carries 1 mark each.
- Q 21 to 27 are short answer question and carry 2 marks each.
- Q 28 to 34 are also short answer question and carry 3 marks each.
- Q 35 to 37 are long answer questions and carry 5 marks each.
- There is no overall choice. However internal choice have been provided in some questions.
- Use of log tables if necessary. Use of calculators is not allowed.

SECTION-A

1. The number of nodal planes in p_x orbitals is
   (a) 1 (b) 2 (c) 3 (d) 0

2. Which of the following has smallest bond angle?
   (a) H_2O (b) H_2S (c) NH_3 (d) SO_2

3. For a reaction to be spontaneous at all the temperature:
   (a) ΔG –ve, ΔH +ve, ΔS +ve
   (b) ΔG +ve, ΔH -ve, ΔS +ve
   (c) ΔG –ve, ΔH -ve, ΔS - ve
   (d) ΔG –ve, ΔH -ve, ΔS +ve

4. Which is is most strongly hydrated?
   (a) Li^+ (b) Na^+ (c) K^+ (d) Rb^+

5. Which of the following has largest ionic radii?
   (a) Na^+ (b) Mg^{2+} (c) F^- (d) O^{2-}

6. When carbon is bonded to four other atoms or groups it uses _____ hybrid orbitals.

7. Surface tension _____ with increase in temperature.

8. The second electron gain enthalpy is _____.

Directions for Question No. 9 and 10 : A statement of assertion (A) followed by a statement of reason (R) is given. Choose the correct option out of the choices given below for each question:

(a) A and R both are correct and R is the correct explanation of A.

(b) A and R both are correct but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A and R both are false.

9. **Assertion:** The entropy of ice is less than that of water.
Reason: Ice has a cage like structure.

10 **Assertion:** London forces are much more stronger between Xenon atoms than between Helium atoms.
Reason: Xenon atom is bigger than Helium atom.

11. Write empirical formula of CH_3COOH and K_2CO_3

Or

Define mole fraction.

12. Mention the quantum number which determines the energy of electron in the H-atom.

Or

How many unpaired electrons are there in Ni^{2+} ion? (Given : Z =28)

13. State the condition for the formation of precipitate.

Or

Write the conjugate acid and conjugate base of HSO_4^-.

14. Using VSEPR theory draw the shape of XeF_4 molecule.

15. Write IUPAC name of $CH_2 = CH - CH(OH)C \equiv CH$.

16. In a reaction between an oxidant and a reductant which will give up electrons and which will accept electrons?

Or

Calculate oxidation number of Cr in $K_2Cr_2O_7$ and Mn in $KMnO_4$.

17. Elements of which group form electron precise hydrides?

Or

Which part of periodic table is known as hydride gap?

18. State the reason of using certain alkali metals in photoelectric cells.

Or

Name those alkaline earth metals which do not impart colour to the flame.

19. Mention the compounds which are responsible for ozone layer depletion.

20. Cis But-2-ene has lower melting point that trans But-2-ene. Give reason.

SECTION: B

21. Balance the following redox reaction in acidic medium by ion electron method.

$Zn(aq.) + NO_3^-(aq.) \longrightarrow Zn^{2+}(aq.) + N_2O(g) + H_2O$

22. (i) Mg^{2+} ion is smaller than O2-ion, although both are isoelectronic. Give reason.

(ii) Write IUPAC name and symbol for the element with atomic no. 120.

23. (i) Mention the number of radial nodes in 6s orbitals.

(ii) Write electronic configuration of Fe^{2+} ion. (Given, Z = 26)

Or

Calculate the wavelength of a ball of mass 0.1kg moving with a velocity of $10ms^{-1}$. (Given, $h = 6.626 \times 10^{-34}$ Js)

24. Describe on one method to remove permanent hardness of water.

Or

Give one chemical reaction each to show that hydrogen peroxide can act as oxidising as well as reducing agent.

25. Write a short note on Greenhouse effect and global warming.

Or

State the point of differences between Classical and photochemical smog.

26. (i) Stability of carbocations follows the order 3° > 2° > °1. Explain this order of stability of carbocations.

(ii) In what manner is Electromeric effect different from Inductive effect?

27. (i) Mention the reason of not using Wurtz reaction for the preparation of unsymmetrical alkanes from alkyl halides.

(ii) How will you convert Benzene to p-Nitrobromobenzene?

SECTION-C

28. The density of 3M solution of NaCl is 1.25g/mL. Calculate the molality of the solution. (Given: Atomic masses: Na=23u , Cl=35.5u)

Or

Calculate the molarity of nitric acid (HNO_3) in a sample having a density 1.41g/mL and mass percent of nitric acid in it being 69%. (Atomic mass: N=14u, H=1u, O=16u)

29. (i) The ball hit with a hockey by a player does not form a wave. State reason.

(ii) Write the possible values of 'm' for an electron with l=2.

(iii) Chromium has configuration $3d^5 4s^1$ and not $3d^4 4s^2$.Explain.

30. (i) Explain non linear shape H_2S and non-planar shape of PCl_3 using VSEPR theory.

(ii) Can we have a diatomic molecule with its ground state molecular orbitals full with electrons. Give reason for your answer.

31. Calculate enthalpy change for the reaction:

$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$

The enthalpy of formation of $CH_4(g)$,$CO_2(g)$ and $H_2O(l)$ are -74.8kJmol^{-1}, -393.5 kJmol^{-1} and 285.8kJmol^{-1} respectively.

Or

Calculate the bond enthalpy of Cl-Cl bond from the following data:

$CH_4(g) + Cl_2(g) \rightarrow CH_3Cl(l) + HCl \quad \Delta H = -100.3 kJmol^{-1}$

Given: bond enthalpies of C — H, C — Cl and H — Cl bonds are 413, 326 and 431 kJmol^{-1} respectively.

32. A neon-dioxygen mixture contains 70.6 g dioxygen and 167.5 g neon. If pressure of the mixture of gases in the cylinder is 25 bar, what is the partial pressure of dioxygen and neon in the mixture? (Atomic mass: O = 16u, Ne = 20u)

33. (i) Compounds of beryllium are much more covalent than other group 2 elements. Give reason.

(ii) Why does the solubility of alkaline earth metal carbonates and sulphates in water decrease down the group?

(iii) When a metal of group 1 is dissolved in liquid ammonia a blue solution is obtained initially. How do you account for the blue colour of the solution?

34. (i) State the necessary compound to be aromatic according to Huckel's rule.

(iii) Explain why alkyl groups act as electron donors when attached to a π system.

Or

(i) Draw the resonance structures of Phenol.

(ii) Suggest a method used to purify the liquids which have high boiling points and decompose below their boiling points.

SECTION-D

35. (i) Boron trihalides(BX_3) act as Lewis acids. Why?
    (ii) Conc. HNO_3 can be transported in aluminium containers. Give reason.
    (iii) Pb(IV) is less stable tha Pb(II). Give reason.
    (iv) Gallium has higher ionisation enthalpy than aluminium. Why?
    (v) What do you understand by diagonal relationship?

    Or

    (i) Why CCl_4 is resistant to hydrolysis but $SiCl_4$ is readily hydrolysed?
    (ii) Explain why there is a decrease in ionisation enthalpy from carbon to silicon?
    (iii) Boron does not form B^{3+} ion. Give reason.
    (iv) How can you explain greater stability of BCl_3 as compared to $TlCl_3$?
    (v) Define diagonal relationship between elements in modern period table.

36. (i) Explain common ion effect with example.
    (ii) The concentration of hydrogen ion in a sample of soft drink is 4 x 10-3 M. Calculate its pH.
    (iii) What is the effect of removal of CH_3OH on the equilibrium of the reaction, $2H_2(g) + CO(g) \rightleftharpoons CH_3OH(g)$.

    Or

    (i) Calculate H_3O^+ ion concentration of a water sample having pH = 6.78.
    (ii) Define buffer solutions.
    (iii) State Lewis definition of acids and bases. Give one example of each.

37. (i) An alkene A on ozonolysis gives a mixture of propanal and pentan-3-one. Write the structural formula of A.
    (ii) Complete the following reactions:
    (a) $CH_3CH{=}CH_2 + HBr \xrightarrow{\text{organic peroxide}}$
    (b) $CH_3CH_2Br + Na \xrightarrow{\text{Dry Ether}}$
    (iii) Write a short note on Friedel Crafts alkylation.

    Or

    (i) Why eclipsed form and staggered form of ethane cannot be isolated at room temperature?
    (ii) State Markovnikov's rule.
    (iii) Which out of Ethene or Ethyne is more acidic and why?
    (iv) What happens with 2-Bromobutane is being treated with KOH (alcoholic)?

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