

BUDHA DAL PUBLIC SCHOOL, PATIALA
Final Examination (26 February 2026)

Class XI (Science)
Subject - Chemistry
(Set - B)

M.M. 70

Time: 3hrs.

General Instructions:

1. There are 33 questions in this question paper with internal choice.
2. Section A consists of 16 multiple-choice questions carrying 1 mark each.
3. Section B consists of 5 short answer questions carrying 2 marks each.
4. Section C consists of 7 short answer questions carrying 3 marks each.
5. Section D consists of 2 case-based questions carrying 4 marks each.
6. Section E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.
8. Use of log tables and calculators is not allowed.

Section - A

- Q1. The number of water molecule is maximum in
a) 18 g of water b) 18 moles of water c) 18 molecules of water d) 1.8 gram of water
- Q2. Orbital angular momentum depends on
a) l b) n and l c) n and m d) m and s
- Q3. The electro negativity of the following elements increases in the order
a) C, N, Si, P b) N, Si, C, P c) Si, P, C, N d) P, Si, N, C
- Q4. In the structure of ClF_3 , the number of lone pairs of electrons on central atom 'Cl' is
a) one b) two c) four d) three
- Q5. The total entropy changes for a system and its surrounding increases, if the process is
a) reversible b) irreversible c) exothermic d) endothermic
- Q6. For the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ the standard free energy is $\Delta G^0 > 0$. The equilibrium constant (K) would be
a) $K = 0$ b) $K > 1$ c) $K = 1$ d) $K < 1$
- Q7. Calculate the oxidation number S in $H_2S_4O_6$
a) +2 b) +3 c) +5 d) 1.5
- Q8. The pair of electron in the given carbocation $CH_3C \equiv C^+$ is present in which of the following orbitals?
a) Sp^3 b) Sp^2 c) Sp d) $2p$
- Q9. The IUPAC name of the compound
$$CH_3 - \overset{\overset{CH_3}{|}}{C} - \overset{\overset{CH_3}{|}}{C} = CH_2$$

a) 3, 3 Dimethyle but - 1 - ene b) 4, 5 - Dimethyl pent - 2 - ene
c) 2 - methyls pent - 1 - ene d) 3 - methyl pent - 2 - ene
- Q10. Nitro group in nitro benzene is
a) Ortho director b) Meta director c) Para director d) Ortho para director
- Q11. Which of the following compounds has zero dipole moment?
a) CCl_4 b) $CHCl_3$ c) HF d) NH_3
- Q12. Which of the following is dependent on temperature?
a) Molarity b) Molality c) Mole fraction d) Mass percentage

B-1



The questions (Q.No. 13 - 16) given below consist of Assertion and Reason. Use the following key of select the correct answer.

- Assertion and Reason both are correct and reason is correct explanation for assertion.
- Assertion and Reason both are correct but reason is not correct explanation for assertion.
- Assertion is correct but Reason is incorrect.
- Assertion is incorrect but Reason is correct.

Q13. Assertion : Trans - Alkenes melts at lower temperature than cis - alkenes
Reason : Trans - Alkenes are symmetrical

Q14. Assertion : $\text{CH}_3 - \text{N}^+ \equiv \text{O}^-$ and $\text{CH}_3 - \text{O} - \text{N} = \text{O}$ do not represent the resonance structure.
Reason : The two structures involves a change in the position of atoms.

Q15. Assertion : A substance which gets oxidized can act as an oxidizing agent.
Reason : In the reaction, $3 \text{ClO}^- \rightarrow \text{ClO}_3^- + 2 \text{Cl}^-$, Cl atoms is oxidized as well as reduced.

Q16. Assertion : A buffer solution has a capacity to resist the change in pH value on addition of small amount of acid on base to it.
Reason : An aquerus solution of ammonium acetate can act as a buffer.

Section - B

Q17. a). How many significant figures are present in 2.0034

b) Calculate the number of atoms in 52g of He (Atomic mass of He = 4)

Q18. An element P has atomic number $Z = 25$ and Q has atomic number $Z = 9$. Locate the position of these elements in terms of group, period and block.

Q19. In a process 701 J of heat is absorbed by a system and 394 J of work is done by the system. What is the change in internal energy of the process?

Q20. How will the values for K_p and composition of equilibrium mixture be affected by
a) increasing the pressure b) increasing the temperature c) using a catalyst
on equilibrium of the reaction $\text{CH}_4(g) + \text{H}_2\text{O}(g) \rightleftharpoons \text{CO}(g) + 3\text{H}_2(g)$

Q21. Write the IUPAC names of the following :



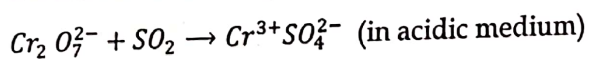
OR

among primary, secondary and tertiary carbocation which is more stable and why?

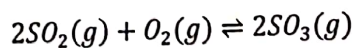
Section - C

Q22. Propanal and pentan - 3 - one are the ozonolysis products of an alkene. What is structural formula and IUPAC name of the alkene?

Q23. Balance the following redox reaction by Ion election method.



Q24. At 450 K $K_p = 2 \times 10^{10}$ / bar for the given reaction at equilibrium



What is K_c at this temperature? ($R = 0.0831 \text{ L bar K}^{-1} \text{ mol}^{-1}$)

Q25. Define the following terms

- Intensive property with example
- First law of thermo dynamics
- Heat capacity

B-2

26. In the estimation of sulphur by carius method. 0.468g of an organic sulphur compound afforded 0.668g of BaSO_4 . Find out the percentage of sulphur in the given compound.
(Given Atomic Mass of Ba = 137 U, S = 32 U and O = 16 U)
- Q27. a) Write the electronic configuration of Cr ($Z = 24$)
b) How many subshells are associated with $n = 4$?
c) How many electrons will be present in the subshell having m_s values of $-\frac{1}{2}$ for $n = 4$?

- Q28. a) Define Dipole moment.
b) Which out of NH_3 and NF_3 has higher dipole moment and why?

OR

Draw molecular orbital diagram of N_2 molecule. On the basis of this calculate Bond order and magnetic character of O_2 molecule.

Section - D

- Q29. Read the following passage and answer the questions that follow:

Weak acids and weak bases ionize to a small extent in aqueous solution. Hence, an equilibrium is set up between the ions and the unionized acid or base. The equilibrium constant for such equilibria are called ionization constants or dissociation constants of the weak acid or weak base and represented by ' K_a ' or ' K_b '. The extent to which weak acid or a weak base dissociates is called its degree of dissociation and is represented by ' α '. Knowing degree of dissociation at a particular concentration of a weak acid or base, its ionization constant can be calculated or vice versa. Knowing the H^+ ion concentration or OH^- ion concentration from the values of K_a and C (molar concentration). pH of the solution can be calculated. Also if some salt of the weak acid with a strong base is present alongwith the weak acid, or salt of a weak base with strong acid alongwith the weak base, pH of the solution can be calculated.

Based on the above paragraph, answer the following questions:

- a) The pH of a sample vinegar is 3.76. Calculate the concentration of hydrogen ion in it.
(Antilog $-3.46 = 4.24$)
b) Predict if the solution of the following salts are neutral acidic or basic
 NaCl , KBr , NH_4NO_3 , NaNO_3
c) Define common ion effect with example.

OR

What will be conjugate acids from the following Bronsted Bases NH_2^- , NH_3 , HCOO^-

- Q30. Read the given passage and answer the questions that follow:

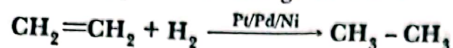
Hydrocarbons are the compounds containing only the hydrogen and the carbon elements. Because of the number and variety of hydrocarbons that can exist, some means of classification is necessary. One means of classification depends on the way in which carbon atoms are connected. Chain aliphatic hydrocarbons are compounds consisting of carbons linked in a single chain or in a branched chain. Cyclic hydrocarbons are aliphatic compound that have carbon atoms linked in a closed polygon (or ring). Another means of classification depends on the type of bonding that exists between carbons. Hydrocarbons that contain only carbon-to-carbon single bonds are called alkanes. These are also referred to as saturated molecules. Hydrocarbons containing with atleast one carbon-to-carbon double bond are called alkenes, and compounds with atleast one carbon to carbon triple bond are called alkynes. These compounds are referred to as unsaturated molecules. Finally, a class of cyclic hydrocarbons that contain a closed loop (sextet) of electrons is called aromatic. The chemical reactivity of hydrocarbons is determined by the type of bond in the compound. Although saturated hydrocarbons (alkanes) will burn (undergo combustion), they are generally unreactive to most reagents. (Alkanes do undergo a substitution reaction with halogens, but require activation by ultraviolet light to make the reaction proceed). Unsaturated hydrocarbons, alkenes and alkynes, not only burn, but also react by addition of reagents to the double or triple bonds. The addition products are saturated, with fragments of the reagent becoming attached to the carbons of the multiple bond. Aromatic compounds, with a higher carbon-to-hydrogen ratio than non-aromatic compounds, burn with a sooty flame as a result of unburnt carbon particles being present. These compounds undergo substitution in the presence of catalysts rather than an addition reaction.

B-3

1. Write the general combustion reaction of alkanes.

OR

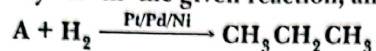
What is the type of reaction given below



2. Write the missing reagent in the reaction given below:



3. Identify "A" in the given reaction, and write its IUPAC name.



Section - E

- Q31. a) Describe the hybridisation in case of PCl_5
b) Why are the axial bonds longer as compared to equatorial bond?
c) Draw the Lewis dot structure of NO_3^- and calculate formal charge on nitrogen.

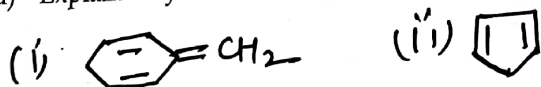
OR

- a) Write the difference between electron affinity and electronegativity.
b) Draw the resonance structure of CO_3^{2-} molecule
c) Define hydrogen bond. Is it weaker or stronger than the Vander Waals forces?
- Q32. a) Depict the galvanic cell in which the reaction $\text{Zn(s)} + 2\text{Ag}^+ \rightarrow \text{Zn}^{2+} + 2\text{Ag(s)}$ takes place, further shows:
(i) Which of the electrode is negatively charged
(ii) The carriers of the current in the cell
(iii) Individual reaction at each electrode
b) Arrange the following metals in the order in which they displace each other from the solution of their salts. Al, Cu, Fe, Mg, Zn

OR

- a) Balance the following redox reaction by oxidation number method
 $\text{MnO}_4^- + \text{I}^- \rightarrow \text{MnO}_2 + \text{I}_2$ (in basic medium)
b) Fluorine reacts with ice and results in the change :
 $\text{H}_2\text{O(s)} + \text{F}_2(\text{g}) \rightarrow \text{HF(g)} + \text{HOF(g)}$
Justify that this reaction is a redox reaction.

- Q33. a) Explain why the following systems are not aromatic



- b) Addition of HBr to propene yields 2 - Bromo propane, while in presence of benzoyl peroxide the same reaction, yields 1 - bromopropane. Explain and give mechanism.

OR

- a) Write Friedal Craft Acylation Reaction
b) How would you convert the following compound in:
(i) Ethyne to Benzene
(ii) 1 - Bromoethane to Butane
c) Draw the Newman conformation of ethane. Which conformation is more stable?

B-4