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AUGUST MONTHLY EXAMINATION-2025 **MARKS: 70**

STD: XI **CHEMISTRY** **TIME: 3.00 HRS**

PART – A

I. Choose the correct answer: **15 x 1 = 15**

1. Homolytic fission of covalent bond leads to the formation of
   (a) electrophile (b) nucleophile. (c) Carbo cation (d) free radical
2. Connect pair of compounds which give blue colouration/precipitate and white precipitate respectively, when their Lassaigne's test is separately done.
   a) NH_2NH_2HCl & $ClCH_2 – CHO$ b) $NH_2CS\ NH_2$ & $CH_3 – CH_2Cl$
   c) $NH_2CH_2\ COOH$ & NH_2CONH_2 d) $C_6H_5NH_2$ & $ClCH_2 – CHO$
3. The maximum number of electrons in a sub shell is given by the expression
   a) $2n^2$ b) 2l + 1 c) 4l + 2 d) none of these
4. Electron density in the yz plane of $3d_{xy}$ orbital is
   a) zero b) 0.50 c) 0.75 d) 0.90
5. In an isothermal reversible compression of an ideal gas the sign of q, ΔS and w are respectively
   a) +, –, – b) –, +, – c) +, –, + d) –, –, +
6. In an adiabatic expansion of an ideal gas_____
   a) w = – Δu b) w = Δu + ΔH c) Δu = 0 d) w = 0
7. The intensive property among the quantities below is
   a) density b) volume c) enthalpy d)mass
8. The values of ΔH and ΔS for a reaction are respectively 30 kJ mol^{-1} and 100 JK^{-1} mol^{-1}. Then the temperature above which the reaction will become spontaneous is
   a) 300 K b) 30 K c) 100 K d) 20^0C
9. What is the hybridisation state of benzyl carbonium ion?
   (a) sp^2 (b) spd^2 (c) sp^3 (d) sp^2
10. Which of the following pairs of d-orbitals will have electron density along the axes?
    a) d_{z2}, d_{xz} b) d_{xz}, d_{yz} c) d_{z2}, d_{x2-y2} d) d_{xy}, d_{x2-y2}
11. Two electrons occupying the same orbital are distinguished by
    a) azimuthal quantum number b) spin quantum number
    c) magnetic quantum number d) orbital quantum number
12. The order of effective nuclear charge felt by an electron in an electron in an orbital with in the given shell is _____
    a) s<p<d<f b) f<d<p<s c) s<d<p<f d) d<f<s<p
13. Match of following

1) $–NO_2$	i) propyl
2) $-OCH_3$	ii) amino
3) $-CH_2-CH_2-CH_3$	iii) methoxy
4) $–NH_2$	iv) nitro

    a) (1)- (iii), (2)-(ii) , (3)-(iv), (4)-(i) b) (1)- (iii), (2)-(iv) , (3)-(i), (4)-(ii)
    c) (1)- (iv), (2)-(iii) , (3)-(i), (4)-(ii) d) (1)- (ii), (2)-(i) , (3)-(iv), (4)-(iii)
14. How many cyclic and acyclic isomers are possible for the molecular formula C_3H_6O?
    a) 4 b) 5 c) 9 d) 10
15. The geometrical shape of carbocation is
    (a) Linear (b) tetrahedral (c) Planar (d) Pyramidal

PART - B

II. Answer any 6 of the following questions. Question No. 24 is compulsory. **6 X 2 = 12**

16. What are electrophiles and nucleophiles? Give suitable examples for each.

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17. a) State the first law of thermodynamics. b) Define Hess's law of constant heat summation.
18. Explain Aufbau principle with diagram.
19. 30.4 kJ is required to melt one mole of sodium chloride. The entropy change during melting is 28.4 JK^{-1} mol^{-1}. Calculate the melting point of sodium chloride.
20. Describe the reaction involved in the detection of nitrogen in an organic compound by lassaigne method.
21. Define orbital? what are the n and l values for 3px and $4dx^2$-y^2 electron?
22. a) State Hund's rule. Give one example. b) What is exchange energy?
23. State and explain Pauli exclusion principle?
24. Which ion has the stable electronic configuration why? Ni^{2+} or Fe^{3+}?

PART – C

III. Answer any 6 of the following questions. Question No. 33 is compulsory. 6 x 3 = 18

25. Write short notes on: (a) Resonance(b) Electromeric effect.
26. Describe optical isomerism with suitable example. What are the condition required for optical activity?
27. An atom of an element contains 35 electrons and 45 neutrons. Deduce i) The number of protons ii) The electronic configuration for the element iii) All the four quantum numbers for the last electron.
28. Derive de Broglie equation?
29. What are spontaneous reactions? What are the conditions for the spontaneity of a process?
30. Give the general characteristics of organic compounds?
31. Derive the relation between ΔH *and* ΔU *for an ideal gas. Explain each term involved in the* Equation.
32. 0.24g of an organic compound gave 0.287 g of silver chloride in the Carius method. Calculate the percentage of chlorine in the compound.
33. a) Give the structural formula for the following compounds.
    i) m-dinitrobenzene ii) p-dichlorobenzene iii) 1,3,5-Trimethyl benzene

b) What is the de Broglie wavelength of a 160g cricket ball travelling at 140 Km hr^{-1}

PART – D

IV. Answer in detail: 5 x 5 = 25

34. a) Explain various types of constitutional isomerism in organic compounds. **(OR)**
    b) i) Heisenberg's uncertainty principle.
    ii) Give the structure for the following compound.
    (i) 3-ethyl-2-methyl -1-pentene (ii) 1,3,5-trimethyl cyclohex-1-ene
    (iii) tertiary butyl iodide
35. a) Describe the classification of organic compounds based on their structure. **(OR)**
    b) Explain paper chromatography.
36. a) Explain inductive effect with suitable example. **(OR)**
    b) Write postulates of Bohr's atomic model.
37. a) i) Calculate the enthalpy of hydrogenation of ethylene from the following data. Bond energies of C − H, C − C , C = C and H − H are 414, 347, 618 and 435 kJ mol^{-1}.
    ii) Explain the born haber cycle for the formation of NaCl. **(OR)**
    b) List the characteristics of Gibbs free energy.
38. a) List the characteristics of internal energy. **(OR)**
    b) Calculate the uncertainty in the position of an electron, if the uncertainty in its velocity is 5.7×10^5 ms^{-1}.
