



**SREE SARAVANA NIKETAN MATRIC HR SEC
SCHOOL, NERINJIPETTAI
XI-CHEMISTRY (UNITS 2,3,6 AND 11)**

UNIT 2 Quantum Mechanical Model of Atom

1. Write note on Thomson and Rutherford atom model (39)
2. Give the Limitations of Rutherford atom model (39)
3. Explain Bohr atom model (39,40)
4. Give the Limitations of Bohr atom model (40)
5. **Derive de Broglie equation (40,41)**
6. Calculating de Broglie wavelength in the following two cases:
 - (i) A 6.626 kg iron ball moving at 10 ms⁻¹
 - (ii) An electron moving at 72.73 ms⁻¹ (41)
7. Show that the circumference of the Bohr orbit for the hydrogen atom is an integral multiple of the de Broglie wavelength associated with the electron revolving around the nucleus. (41,42) book back question
8. Explain Davisson and Germer experiment (42)
9. **State Heisenberg's uncertainty principle (42)**
10. Calculating the uncertainty in the velocity of the electron in hydrogen atom. (Bohr radius of 1st orbit is 0.529 Å) Assuming that the position of the electron in this orbit is determined with the accuracy of 0.5 % of the radius. (42)
11. Explain briefly the time independent Schrödinger wave equation? (43) book back question
12. **Define orbital (44)**
13. Write a note on quantum numbers (44)
14. **Explain Principal quantum number (n) (44)**
15. Explain Azimuthal Quantum number (l) or subsidiary quantum number (44)
16. Explain Magnetic quantum number (m_l) (45)
17. Explain Spin quantum number (m_s) (45)
18. Explain Main features of the quantum mechanical model of atom (44)
14. **Calculate the maximum number of electrons that can accommodate in L shell (45)**
15. **Calculate the orbital angular momentum of d and f orbital (45)**
16. **How many orbitals are possible in the 4th energy level? (n=4) EY and BB (46)**
17. What is nodal surface or a radial node. (48)
18. Explain shapes of s, p, d and f orbital. (47 to 50)
19. **Calculate the total number of angular nodes and radial nodes present in 3d and 4f orbitals. (50) EY**
20. How many radial nodes for 2s, 4p, 5d and 4f orbitals exhibit? How many angular nodes? (50 model) BB
21. Write note on ground state. (50)
22. Write note on excited states. (50)
23. **Describe the Aufbau principle (52)**
24. **State and explain Pauli exclusion principle. (52)**
25. **How many unpaired electrons are present in the ground state of Fe³⁺ (z=26), Mn²⁺ (z=25) and argon (z=18)? (53) EY**
26. State Hund's rule of maximum multiplicity (53)
27. Write note on electronic configuration of atoms (54)
28. **Write electronic configuration and orbital diagrams for nitrogen atom (54)**
29. Write electronic configuration and orbital diagrams for first 10 elements (55)
30. **The actual electronic configuration of some elements such as chromium and copper slightly differ from the expected electronic configuration. Why? (54,55)**
31. Explain the meaning of the symbol 4f². Write all the four quantum numbers for these electrons. (55) EY
32. Write note Symmetrical distribution of electron (55)
33. What is degenerate orbital (55)
34. Write note on stability of half filled and completely filled orbitals (55) **or In degenerate orbital half filled orbitals and completely filled are more stable than partially filled one why?**
35. Write Expected configuration and Actual configuration for Cu and Cr (55)

36. What is Exchange energy? (56)
37. **Which ion has the stable electronic configuration? Ni²⁺ or Fe³⁺.(57)EY**
38. Give the electronic configuration of Mn²⁺ and Cr³⁺(BB)
39. **Write note on (n+1) rule** (51)
40. Give order of the effective nuclear charge and energy of the orbitals of s,p,d and f(51)

UNIT 3 Periodic Classification Of Elements

- 1. State Döbereiner law of triads (69)**
2. Write note on Lavoisier Classification (70)
3. State Newlands' Octaves(70)
4. State Mendeleev's periodic law (70)
5. Anomalies or limitations of Mendeleev's Periodic Table (72)
6. State Lothar Meyer and A. E. B. de Chancourtois model for periodic table (70)
7. Explain the relationship between atomic number and frequency (72,73)
8. State modern periodic law(73) BB
9. Nomenclature of Elements with Atomic Number Greater than 100(75)
10. Explain Variation of Electronic Configuration along the periods(76)
- 11. Explain Variation of Electronic Configuration in the Groups(77) or s,p,d and f block electronic configuration**
- 12. Give the general electronic configuration of lanthanides and actinides?(77) BB**
13. Predict the position of the element in periodic table satisfying the electronic configuration (n-1)d², ns² where n=5 (78) EY
14. Define Atomic radius(79)
15. Define Covalent radius(79)
16. The experimental internuclear distance in Cl₂ molecule is 1.98 Å. Calculate the covalent radius of chlorine.(79)
17. Briefly give the basis for Pauling's scale of electronegativity. State the covalent radius of hydrogen using the

- experimental dH-Cl value is 1.28 Å and the covalent radius of chlorine is 0.99 Å.(80)
18. Define Metallic radius (80)
19. The distance between the adjacent copper atoms in solid copper is 2.56 Å. Calculate the metallic radius of copper.(80)
20. What is effective nuclear charge?(80) BB
21. What is screening effect? (80) BB
22. Explain Slater's rules for calculating screening constant S (81)
23. Calculating the effective nuclear charge on 4s electron and 3d electron in scandium. (81)
24. Using Slater's rule calculate the effective nuclear charge on a 3p electron in aluminium and chlorine. Explain how these results relate to the atomic radii of the two atoms.(82)EY
- 25. Explain the Pauling method for the determination of ionic radius.(83)**
26. Define Ionisation energy or ionisation potential. Explain the periodic trend of ionization potential.(84,85)
27. Compare ionisation potential of beryllium and boron (85)
28. Define Electron Affinity or electron gain enthalpy (86) Explain the periodic trend of electron affinity. (86)
29. Oxygen and fluorine have lower electron affinity than their respective group elements sulphur and chlorine why?(86)
29. **Define electronegativity.** State the trends in the variation of electronegativity in group and periods. (87,88) BB
30. **The electron affinity values of Be and Mg are almost zero and those of N (0.02 eV) and P(0.80 eV) are very low why? (BB) (86)**
- 31. Why ionisation potential of N is greater than that of O? (85) BB**
32. Briefly give the basis for Pauling's scale of electronegativity.(87)
- 33. Define Valence or Oxidation States(88)**
34. Explain Periodic Trends and Chemical Reactivity(90)

35. Be(OH)₂ amphoteric in nature prove it.(91)

36. Explain the diagonal relationship.(90)BB

UNIT 6 Gaseous State

1.State Boyle's law.(160)BB

2. State Charles Law (161)

3. Give the mathematical expression that relates gas volume and moles.BB OR Avogadro's Hypothesis (165)

4. Gay-Lussac's Law (Pressure-temperature relationship) (164)

5.Derive Ideal gas equation (165,166)

6. State Dalton's law of partial pressures(166)

7. A mixture of gases contains 4.76 mole of Ne, 0.74 mole of Ar and 2.5 mole of Xe. Calculate the partial pressure of gases, if the total pressure is 2 atm. at a fixed temperature.(167)

7. Give the application of Dalton's law (167)

8. State Graham's Law of Diffusion

9. An unknown gas diffuses at a rate of 0.5 time that of nitrogen at the same temperature and pressure. Calculate the molar mass of the unknown gas (168,169)

10. Explain the deviation from ideal gas behavior (169)

11.Derive Compressibility factor Z(169)

12. Write the Van der Waals equation for a real gas. Explain the correction term for pressure and volume (171,172)

13.Explain Andrew's isotherm(172,173)

14.Define T_c, P_c and V_c (173)

15.What is Boyle temperature (or) Boyle point (171)

16. Derive the values of critical constants in terms of van der Waals constants.(174,175bb)

17. Give the different methods used for liquefaction of gases (175)

UNIT 11 Fundamentals of Organic Chemistry

1.Write note on catenation (110)

2. Give the general characteristics of organic compounds? (111,112)

3. Describe the classification of organic compounds based on their structure. (112)

4. Give the IUPAC rules for nomenclature of organic compounds (113)

5.What is Nucleus? (122)

6. Write structural formula for the following compounds

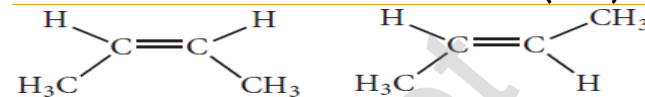
(i) m - dinitrobenzene (ii) p-dichloro benzene (iii) 1, 3, 5-Trimethyl benzene EY (124)

7.IUPAC NAME examples (125-128)

8. Explain various types of constitutional isomerism (structural isomerism) in organic compounds.(131-133) BB

9. Write note on cis and trans isomer (135)

10. Which is cis and trans isomer (135)



11. Which is stable cis or trans isomer? Why? (135)

12. Briefly explain geometrical isomerism in alkene by considering 2-butene as an example.(135-136) BB

14.How will you convert trans to cis isomer?

15. Describe optical isomerism with suitable example.(137) BB

16. What are the conditions for enantiomerism or optical isomerism (137)

17. What is asymmetric carbon or chiral carbon? (137)

18. Describe the reactions involved in the detection of nitrogen in an organic compound by Lassaigne method. BB(138)

19. Test for sulphur (139)

20. Test for phosphorous (139)

21. Give the principle involved in the estimation of halogens: carius method (143) BB

22. Estimation of nitrogen for Dumas method (145)

23. Estimation of nitrogen for Kjeldahl's method (147)

24. Which method used to detect largely in the analysis of foods and fertilizers?(147)

25. Write all the possible isomers of molecular formula C₄H₁₀O and identify the isomerisms found in them. EY(134)

26. Why organic compound need for purification? (149)

27. Define Sublimation (149)

28. Give a brief description of the principles of i) Fractional distillation 150 ii) Column Chromatography 152 BB

29.What is R_f value?(153)

30. Give the structure and IUPAC name for organic compounds BB Q.NO 38,39

READ UNIT 2,3,6 AND 11 ALL BOOK BACK QUESTIONS, EXAMPLES AND EX.SUMS AND EVALUATE YOURSELF QUESTIONS

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