

## ATOMIC STRUCTURE

- Q1. What experiment led to the discovery of electrons? Draw a neat labeled diagram?
- Q2. Write the difference b/w canal rays and cathode rays?
- Q3. Explain with diagram Thomson's Plum pudding model of an atom?
- Q4. Explain Rutherford experiment with neat labeled diagram. Write its observations & conclusions.
- Q5. Explain the draw backs of Rutherford's Experiment.
- Q6. Write the main postulates of Bohr's model of an atom.
- Q7. Explain the first model of an atom based on quantisation of energy.
- Q8. Name two properties of light radiations which indicate its particles like nature.
- Q9. Name two properties of electrons which indicate its wave nature.
- Q10. Explain the following (i) Black – Body radiations (ii) Photo electric effect.
- Q11. Why is photoelectric effect more common in alkali metals?
- Q12. Draw graph between intensity & wavelength for black body radiation at 2 temperatures.  $T_1$  &  $T_2$  ( $T_2 > T_1$ ). Interpret graph.
- Q13. What do you mean by 'Quantum'?
- Q14. Define emission spectrum & Absorption spectrum?
- Q15. What is the value of Rydberg's constant in Joules.
- Q16. Write the expression for energy of  $n^{\text{th}}$  orbit & radius of  $n^{\text{th}}$  orbit for  $\text{He}^+$ .
- Q17. Calculate the momentum of a particle which has Debroglie's wavelength of 1 mm.
- Q18. Find  $\lambda$  of a moving  $e^-$  with  $\text{KE} = 3 \times 10^{-25}$  joules?
- Q19. On the basis of uncertainty principle; show that an electron can't exist in the nucleus.
- Q20. Define quantum mechanics / Name the scientists who developed Quantum mechanics.
- Q21. Draw the plot of orbital wave function  $\psi(r)$  as a function of  $r$  for 1s & 2s orbital.
- Q22. How is the probability density variation of 2s orbital different from that of 1s orbital?
- Q23. Which of the following representations is incorrect for C atom & why?
- (a)  $\begin{array}{|c|c|c|} \hline \uparrow\downarrow & \uparrow\downarrow & \uparrow\uparrow \\ \hline \end{array}$   $\begin{array}{|c|} \hline \\ \hline \end{array}$  (b)  $\begin{array}{|c|c|c|} \hline \uparrow\downarrow & \uparrow\downarrow & \uparrow\uparrow \\ \hline \end{array}$
- 1s 2s 2p 1s 2s 2p
- (c)  $\begin{array}{|c|c|c|} \hline \wedge \vee & \wedge \vee & \uparrow\uparrow \\ \hline \end{array}$  (d)  $\begin{array}{|c|c|c|} \hline \uparrow\downarrow & \uparrow\downarrow & \downarrow\downarrow \\ \hline \end{array}$
- 1s 2s 2p 1s 2s 2p
- Q24. Explain the following:- (a) Heisenberg's Uncertainty Principle (b) Aufbau Principle  
(c) Pauli Exclusion Principle (d) Hund's Rule of Maximum Multiplicity.
- Q25. Explain with reason why 'half filled & completed filled orbital' are stable. Explain in terms of configuration of Cr (24) & Cu (29)
- Q26. How many orbitals will be present in the subshell when (a)  $l = 0$  (b)  $l = 1$  (c)  $l = 3$
- Q27. How many photons of light having wavelength  $7000\text{\AA}$  are necessary to provide 1.0J of energy?