



**INDIAN SCHOOL DARSAIT
DEPARTMENT OF CHEMISTRY**



Subject: Chemistry		Topic: Structure of atom		Date : 11.5.17	
Resource Person: Jyothy Sukhadiya					
Name of Student: _____		Class & Division: XI :		Roll No:	
1.	What are electromagnetic radiations? Give the characteristic properties of electromagnetic radiations.			3	
2.	What are black body radiations?			1	
3.	Explain Planck's quantum theory.			2	
4.	Find energy of each of the photons which (i) correspond to light of frequency 3×10^{15} Hz. (ii) have wavelength of 0.50 \AA .			2	
5.	Define i) Photoelectric effect ii) Threshold frequency iii) Work function			3	
6.	The work function of Cesium atom is 3.04×10^{-19} J. If Cesium element is radiated with a wavelength of 500 nm, calculate the kinetic energy of the ejected electron. ($h = 6.626 \times 10^{-34}$ Js)			2	
7.	Electrons are emitted with zero velocity from a metal surface when it is exposed to radiation of wavelength 6800 \AA . Calculate the threshold frequency and work function of the metal.			3	
8.	Differentiate between Emission spectrum and Absorption spectrum			2	
9.	Explain line spectrum of hydrogen			2	
10.	Give reasons: a) Although hydrogen atom has one electron it's spectrum produces large number of lines. b) Line spectra is regarded as the 'finger prints of atoms'			2	
11.	List out the important postulates of Bohr model of hydrogen atom.			2	
12.	"Energy of an electron is quantized." Explain the statement.			1	
13.	Why is the energy of electron negative?			1	
14.	Calculate the energy absorbed, frequency and wavelength when an electron with energy 217.9×10^{-21} J jumps to an energy level with energy 544.8×10^{-20} J.			3	
15.	What is the wavelength of light emitted when the electron in a hydrogen atom undergoes transition from an energy level with $n = 4$ to an energy level with $n = 2$?			2	
16.	What are the limitations of Bohr's model of atom?			2	
17.	Explain: a) Stark effect b) Zeeman effect			2	
18.	If the velocity of an electron in Bohr's first orbit is 2.19×10^6 m/s, calculate the de-Broglie wavelength associated with it? (mass of electron = 9.1×10^{-31} kg)			2	
19.	State Heisenberg's uncertainty principle. Give its mathematical statement.			2	

20.	Calculate the uncertainty in the position of an electron if the uncertainty in its velocity is 5.7×10^5 m/s.		
21.	Calculate the uncertainty in the velocity of a wagon of mass 2000 kg whose position is known an accuracy of +10 m.	2	
22.	What is the physical significance of λ^2 ?	2	
23.	Differentiate between Orbit and Orbital.	1	
24.	What do you understand by quantum numbers? Give their significance.	2	
25.	State: a) Aufbau principle c) Hund's rule of maximum multiplicity	b) (n+l) rule or Bohr-Bury rule d) Pauli's Exclusion Principle	1 each
26.	Which orbital fills first and why i) 3d or 4p ii) 3d or 4s	2	
27.	Draw the boundary surface diagram of 's' & 'p' and 'd' orbitals	3	
28.	Copper and Chromium show exceptional electronic configurations. Explain giving reasons	2	
29.	Using s,p,d and f notation, describe the orbital with the following quantum numbers- (a) $n=1, l=0$ (b) $n=3, l=1$ (c) $n=4, l=2$ (d) $n=4, l=3$	2	
30.	a) How many electrons are possible in a) 4p b) 5pz c) $n=3, l=2$ d) $n=4, l=2, s=+\frac{1}{2}$ b) What are the values of n and l for the following orbitals: 4p, 3d, and 5f orbital. c) What are the atomic numbers of elements whose outermost electrons are represented by (i) $3s^1$ (ii) $2p^3$ (iii) $3d^6$ (iv) $3p^6$	2 each	
31.	How many electrons in an atom can have the following quantum numbers. (a) $n = 4, m = +1/2$ (b) $n = 3, l = 0$	2	
32.	(a)What is the lowest value of n that allows g orbitals to exist? (b)An electron is in one of the 3d orbitals, Give the values of n,l and m_l for this electron.	2	
33.	Write the electronic configuration of the elements. P, S, Cl^- , O^{2-}	2	
34.	List the quantum numbers of a) unpaired electrons in F, Ni^{2+} b) valence electrons in P, Ca and K	2	
35.	i) Find the total number of electrons with +1/2 value for spin quantum number in Na^+ ? ii) Give the quantum number of the unpaired electron in Cl?	2	
36.	Explain, giving reason which of the following sets of quantum numbers are not possible? i) $n = 0, l = 0, m = 0, s = +1/2$ ii) $n = 1, l = 0, m = 0, s = -1/2$ iii) $n = 1, l = 1, m = 0, s = +1/2$ iv) $n = 2, l = 1, m = 0, s = -\frac{1}{2}$	2	
37.	Which atoms are indicated by the following configurations? (a) $[He] 2s^1$ (b) $[Ne] 3s^2 3p^3$ (c) $[Ar] 4s^2 3d^1$	3	
38.	Which is more stable and why? i) Fe^{2+} or Fe^{3+} ii) Mn^{2+} or Mn^{3+}	2	