

FREEDOM INTERNATIONAL SCHOOL
CHEMISTRY – WORKSHEET
L2 – STRUCTURE OF ATOM

CLASS - XI

1.	The number of nodal planes in p_x orbital is (a) one (b) two (c) three (d) zero
2.	The last entering electron in an element has quantum number $n = 3$, $l = 2$, $m = +2$ and $s = +\frac{1}{2}$. The atomic number of the element will be (a) 13 (b) 21 (c) 29 (d) 49
3.	What is the wavelength of light: Given energy = 2.91×10^{-19} , $h = 6.626 \times 10^{-34}$ Js, $c = 3.0 \times 10^8$ m/s? (a) 6.56 nm (b) 656 nm (c) 0.656 nm (d) 65.6 nm
4.	In an atom, an electron is moving with a speed of 600 m s^{-1} with an accuracy of 0.005%. Certainty with which the position of the electron can be located is: ($h = 6.6 \times 10^{-34} \text{ kg m}^2 \text{ s}^{-1}$, mass of electron = $9.1 \times 10^{-31} \text{ kg}$) (a) $1.52 \times 10^{-4} \text{ m}$ (c) $1.92 \times 10^{-3} \text{ m}$ (b) $5.1 \times 10^{-3} \text{ m}$ (d) $3.84 \times 10^{-3} \text{ m}$
5.	Which of the following orbitals has the highest energy? (a) 5d (b) 5f (c) 6s (d) 6p
6.	Which of the following is responsible to rule out the existence of definite paths or trajectories of electrons? (a) Pauli's exclusion Principle. (b) Heisenberg's uncertainty principle. (c) Hund's rule of maximum multiplicity. (d) Aufbau principle.
7.	From the following find out groups of isotopes, isobars and isotones: $^{16}_8\text{O}$, $^{39}_{19}\text{K}$, $^{14}_6\text{C}$, $^{239}_{92}\text{U}$, $^{14}_7\text{N}$, $^{40}_{20}\text{Ca}$, $^{238}_{92}\text{U}$, $^{77}_{32}\text{Ge}$, $^{77}_{33}\text{As}$, $^{18}_8\text{O}$, $^{76}_{32}\text{Ge}$, $^{78}_{34}\text{Se}$
8.	To which orbit will the electron in H-atom jump on absorbing 12.1 eV energy?
9.	Why do cathode rays not depend upon the nature of gas or the cathode material

	used in discharge tube?
10.	Assuming that a 25 watt bulb emits monochromatic yellow light of wave length 0.57μ . Calculate the rate of emission of quanta per second.
11.	An electron beam after hitting a neutral crystal produces a diffraction pattern. What do you conclude?
12.	How many unpaired electrons are present in Pd ($Z = 46$) ?
13.	Calculate the energy associated with the first orbit of He^+ . What is the radius of this orbit?
14.	What will the order of energy levels 3s, 3p and 3d in case of H-atom be? Justify your answer.
15.	The effect of uncertainty principle is significant only for the motion of microscopic particles and is negligible for the macroscopic particles. Justify the statement with the help of a suitable example.
16.	Calculate the wavelength of 1000 kg rocket moving with a velocity of 3000 km/hr.
17.	According to de Broglie, matter should exhibit dual behaviour, that is both particle and wave like properties. However, a cricket ball of mass 100 g does not move like a wave when it is thrown by a bowler at a speed of 100 km/h. Calculate the wavelength of the ball and explain why it does not show wave nature.
18.	What are the four quantum numbers of the 11th electron of copper?(Atomic number = 29)
19.	Calculate the wave number for the longest wavelength transition in the Balmer series of atomic hydrogen.
20.	An electron is in 5f-orbital. What possible values of quantum numbers n, l, m and s can it have?
21.	What designation is given to an orbital having (i) $n = 2, l = 1$ and (ii) $n = 3, l = 0$?
22.	An element has 8 electrons in 4d-subshell. Show the distribution of 8 electrons in the d-orbitals of the element.
23.	A neutral atom has 2K electrons, 8L electrons and 6 M electrons. Predict the following from this: (a) its atomic number (b) total number of s-electrons (c) total number of p-electrons (d) total number of d-electrons.
24.	The uncertainty in position and velocity of a particle are 10^{-10} m and $5.27 \times 10^{-24} \text{ ms}^{-1}$ respectively. Calculate the mass of the particle.
25.	Hydrogen atoms are excited from ground state. Its spectrum contains wavelength 486 nm. Find the transition the line corresponds to. Also find from this information what other wavelengths are present in the spectrum.