Chemistry Worksheet - IIT JEE
Topic : Structure of Atom

1. Two electrons A and B in an atom have the following set of quantum numbers ;

A : 3 , 2, -2 , + ½   B : 3, 0, 0, + ½ ,   Which statement is correct for A and B ?

(a) A and B have same energy   (b) A has more energy than B

(c) B has more energy than A   (d) A and B represents same electron

2. Which has highest e/m ratio ?   (i) He^{2+} (ii) H^+ (iii) He   (iv) H

3. The number of nodal planes in a p⬚- orbital is: (a) 1   (b) 2   (c) 3   (d) zero

4. The potential energy of the electron present in the ground state of Li^{2+} ion is represented by :

(a) $+ \dfrac{3e^2}{4\pi\varepsilon_0 r}$ (b) $- \dfrac{3e^2}{4\pi\varepsilon_0 r}$ (c) $- \dfrac{3e^2}{4\pi\varepsilon_0 r^2}$ (d) $- \dfrac{3e^2}{4\pi\varepsilon_0 r}$

5. The electronic configuration of chromium is **$1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^6$, $3d^5$, $4s^1$**. This represents its :
(a) excited state   (b) ground state   (c) cationic form   (d) anionic form.

6. If uncertainty in position of electron is zero, the uncertainty in its momentum would be :
(a) zero   (b) $\dfrac{h}{2\pi}$ (c) $\dfrac{h}{4\pi}$ (d) infinity

7. Dimensions of Planck's constant are : (a) force x time   (b) energy x distance
(c) energy/ time (d) energy x time

8. Of the following transitions in hydrogen atom, the one which gives an absorption line of lowest frequency
is: (a) n= 1 to n= 2   (b) n= 3 to n= 8   (c) n= 2 to n= 1   (d) n= 8 to n= 3

9. In potassium the order of energy level for 19th electron is : (a) $3s > 3d$ (b) $4s < 3d$ (c) $4s > 4p$ (d) $4s = 3d$

10. If the mass number of an element is W and its atomic number is N, then**.**

(a) number of $_{-1}e^0 = W - N$ (b) number of protons $(_1H^1) = W - N$

(c) number of $_0n^1 = W - N$ (d) number of $_0n^1 = N$

11. Which set of phenomenon shown by the radiation proves the dual nature of radiation proves the dual
nature of radiation ?   (a) Scintillation   (b) Interference and diffraction
(c) Interference and photoelectric effect   (d) None of the above.

12. If the speed of electron in the Bohr's first orbit of hydrogen atom is x, the speed of the electron in the
third Bohr's orbit is **:**   (a) $\dfrac{x}{9}$ (b) $\dfrac{x}{3}$ (c) 3x   (d) 9x

13. An oil drop has charge 639 x 10^{19} C. The total number of electrons on oil drop are :

(a) 1   (b) 2   (c) 3   (d) 4

14. The highest excited state that unexcited hydrogen atom can reach when they are bombarded with 12.2 eV electron is : (a) n =1   (b) n = 2   (c) n = 3   (d) n = 4

15. For which of the following, the radius will be same as hydrogen atom having n = ?

(a) He^+, n = 2   (b) Li^{2+}, n = 2   (c) Be^{3+}, n = 2   (d) Li^{2+}, n = 3

16. The energy of second Bohr's orbit in H- atom is -328 kJ mol^{-1}, hence the energy of fourth Bohr orbit would be **:**   (a) -82 kJ mol^{-1} (b) -41 kJ mol^{-1} (c) -1312 kJ mol^{-1} (d) -164 kJ mol^{-1}

17. Number of visible lines when an electron returns from 5th orbit to ground state in hydrogen spectrum is:

(a) 5   (b) 4   (c) 3   (d) 10

18. The alpha particle scattering : (a) is due to nuclear forces . (b) is due to Coulomb force

(c) path is parabola   (d) path is hyperbola.

19. Which of the following are correct **?**

(a) Each atom has at least one orbital symmetrical about the nucleus.

(b) Each orbit has at least one orbital symmetrical about the nucleus.

(c) Number of electrons in Ne having their angular momentum equal to zero are four.

(d) Number of waves made by an electron in an orbit is equal to number of orbit.

20. Select the correct statements:

 (a) An electron in an orbit can absorb only one photon and that too equivalent in energy to the energy difference between two orbits.

(b) 3d subshell penetrates more towards nucleus than 4s

(c) Green light is never emitted in black body radiations.

(d) The energy change between two successive orbits increases with increasing value of n.