DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 8

Topic :- STRUCTURE OF ATOM

1 **(b)**

Find λ from $E = \frac{hc}{\lambda}$; It comes out to be 4965 Å, which represents visible region (*i.e.*, in between $3800 - 7600$ Å).

2 **(a)**

The ground state configuration of chromium is

${}_{24}\text{Cr} = [\text{Ar}]3d^5 4s^1$

$\therefore \quad {}_{24}\text{cr}^{2+} = [\text{Ar}]3d^4 4s^0$

3 **(b)**

The atomic number of cesium is 55. The electronic configuration of cesium atom is

${}_{55}\text{Cs} = 1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^2, 3d^{10} 4p^6, 5s^2, 4d^{10}, 5p^6, 6s^1$

The electronic configuration of cesium atom is

$\text{Cs}^+ = 1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^6 4d^{10}, 5s^2 5p^6, 6s^0$

So, the total number of s-electrons $=10$,

The total number of p-electrons$=24$,

The total number of d-electrons$=20$

4 **(c)**

$KE = (1/2)mu^2 = \text{eV}$

$\therefore u = \sqrt{\frac{2eV}{m}}$

5 **(b)**

Sine, $E \propto -\frac{1}{n^2}$

The energy of an electron in the second orbit will be

$E_2 = \frac{E_1}{4} = \frac{(-2.18 \times 10^{-18}\text{J})}{4}$

$= -5.45 \times 10^{-19}\text{J}$

6 **(b)**

Velocity of an electron in first orbit of H atom is

$u = \frac{2.1847 \times 10^8}{1}\,\text{cms}^{-1}$

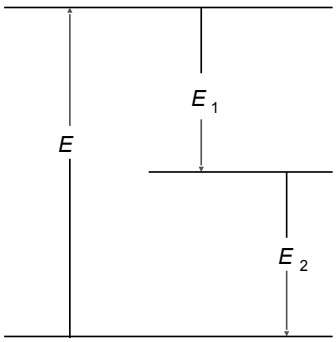
Hence, it is $\frac{1}{100}$th as compared to the velocity of light.

7 **(c)**

Energy values are always additive.

$E_{\text{total}} = E_1 + E_2$

$\frac{hc}{\lambda} = \frac{hc}{\lambda_1} + \frac{hc}{\lambda_2}$



$\frac{1}{\lambda} = \frac{1}{\lambda_1} + \frac{1}{\lambda_2}$

$\frac{1}{355} = \frac{1}{680} + \frac{1}{\lambda_2}$

$\lambda_2 = 742.77 \text{ nm} \approx 743 \text{ nm}$

8 **(d)**

Bohr's model is against the law of electrodynamics.

9 **(b)**

Fe^{3+} ion has the following configuration

$Fe^{3+} = 1s^2,2s^2 2p^6,3s^2 3p^6 3d^5$

Hence, ferric ion is quite stable due to half-filled d-orbitals.

10 **(c)**

During the experimental verification of de Broglie equation, Davission and Germer confirmed wave nature of electron.

For a given shell, say $n = 2, l = 0 \ \therefore m = 0$

$l = 1 \ \therefore m = -1, 0, +1$

11 **(c)**

Anode rays particles are ionised gaseous atoms left after removal of electron.

12 **(c)**

P has 5 valence electron; each H has 1;

Thus, total electrons $= 5 + 4 - 1 = 8$.

13 **(b)**

Neutron is composed of $_{+1}p^1 + \ _{-1}e^0$ and thus, net charge is zero.

14 **(c)**

Picture tube of TV set is cathode rays tube.

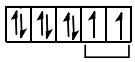
15 **(d)**

s-subshell has only one orbital and that is spherical, hence, s-orbitals are non-directional.

16 **(b)**

$_{28}Ni = 1s^2,2s^2,2p^6,3s^2,3p^6,4s^2,3d^8$

$Ni^{2+} = 1s^2,2s^2,2p^6,3s^2,3p^6,3d^8$



two unpaired electrons

17 **(d)**

In $_1H^3$, nucleons are 3.

19 **(a)**

m can be $+2, +1$ and 0 for $3d$-subshell.

20 **(c)**

For Paschen series, $n_1 = 3$ and $n_2 = 4, 5, 6$

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	B	A	B	C	B	B	C	D	B	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	C	B	C	D	B	D	A	A	C