DPP

DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 1

Topic :- STRUCTURE OF ATOM

1 **(c)**

Isoelectronic species have same number of electron. Mg^{2+} and Na^{+}both have 10 electrons hence, they are isoelectronic species.

2 **(c)**

This is obtained by the solution of Schrodinger wave equation

Probability $= \Psi^2 dV$

Ist orbital is spherically symmetrical

$\therefore V = \frac{4}{3}\pi r^3, \therefore \frac{dV}{dr} = 4\pi r^2$

$\because$ Probability $= \Psi^2 4\pi r^2 dr$

4 **(a)**

$\Delta E_{(eV)} = \frac{12375}{\lambda_{\text{in Å}}} = \frac{12375}{5890} = 2.10$ eV

5 **(b)**

1 eV $= 1.602 \times 10^{-12}$erg.

6 **(b)**

s can have only two values $+1/2$ and $-1/2$.

7 **(c)**

The de-Broglie wavelength associated with the charged particle as

For electron, $\lambda = \frac{12.27}{\sqrt{V}}$Å

For proton, $\lambda = \frac{0.286}{\sqrt{V}}$Å

For α-particles, $\lambda = \frac{0.101}{\sqrt{V}}$Å

8 **(b)**

$$\lambda = \frac{h}{mv} = \frac{6.63 \times 10^{-34}}{1.67 \times 10^{-27} \times 1 \times 10^3}$$
$$= 3.97 \times 10^{-10}\text{m} \sim 0.40 \text{ nm}.$$

9 **(b)**

The number of waves in an orbit$=n$.

10 **(a)**

$E \propto \left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

or $E \propto \frac{1}{n^2}$

11 **(b)**

n is an integer except zero.

12 **(c)**

According to aufbau principle, electrons enter into orbitals according to their energy. The electrons first enters into orbital having lesser value of $(n + l)$. If the value of $n + l$ is same for two orbitals then the electron will first enter into orbital having lesser value of n.

$n = 5, l = 0 \quad \therefore n + l = 5 + 0 = 5$

For other,

$n = 3, l = 2 \quad \therefore n + l = 3 + 2 = 5$

$\because$ Both of the orbitals have same value for $n + l$.

$\therefore$ Electron will enter into orbital having lower value of n.

$\therefore$ Electron will enter into $n = 3, l = 2$ orbital.

13 **(b)**

$E = \frac{hc}{\lambda}$,h and c for both causes are same so,

$\frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} = \frac{16000}{8000}$

$E_1 = 2E_2$

14 **(c)**

When $n = 3$, number of values of l are 0 to $(n - 1)$ *i.e.*, 0, 1, 2

Hence,

when $n = 3$, then $l = 3$ does not exist.

15 **(c)**

We know that,

$\Delta E = hc.R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$

For lowest energy, of the spectral line in Lyman series, $n_1 = 1, n_2 = 2$

Hence,

$\Delta E = hc.R\left[\frac{1}{1^2} - \frac{1}{2^2}\right]$

$\Delta E = \frac{3hcR}{4}$

16 **(c)**

Cathode rays are fastly moving electrons.

17 **(c)**

1. $n = 4, l = 0, m = 0, s = +\frac{1}{2}$

$\rightarrow 4s$ energy level.

2. $n = 3, l = 1, m = -1, s = +\frac{1}{2}$

$\rightarrow 3p$ energy level.

3. $n = 3, l = 2, m = -2, s = +\frac{1}{2}$

$\rightarrow 3d$ energy level.

4. $n = 3, l = 0, m = 0, s = +\frac{1}{2}$

$\rightarrow 3s$ energy level.

According to aufbau principle, the energy of orbitals (other than H-atom) depend upon $n + 1$ value.

$n + l$ for $3d = 3 + 2 = 5$

So, it is highest energy level (in the given options).

18 **(d)**
Each one possesses mass.

19 **(c)**
X-rays have larger wavelength than γ-rays.

20 **(c)**
$\Delta E = \frac{hc}{\lambda}$

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