DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 4

Topic :- STRUCTURE OF ATOM

1 **(d)**

Ions have charge, different size and configuration than atom.

2 **(c)**

H^- has two electrons.

3 **(b)**

In the ground state of an atom the number of states is limited by Hund's rule. There are $\frac{\lfloor n}{\lfloor r \cdot \lfloor n-r}$ ways in which electron in an orbital may be arranged which do not violate Pauli's exclusion principle.

Where, n=number of maximum electrons that can be filled in an orbital and r=number of electrons present in orbital.

But the valid ground state term is calculated by Hund's rule of maximum multiplicity. As Hund's rule gives the most stable electronic configuration of electrons.

4 **(a)**

$$\frac{1}{\lambda} = Z^2.R_H\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

$$\Rightarrow \frac{1}{\lambda} = (Z)^2.R_H\left\{\frac{1}{1} - \frac{1}{4}\right\} = \frac{3}{4}R_H Z^2$$

$$\therefore \lambda \propto \frac{1}{Z^2}$$

Hence for shortest λ, Z must be maximum, which is for Li^{2+}.

5 **(c)**

Element with atomic no. 17 has $3s^2 3p^5$ valence shell.

6 **(b)**

The electronic configuration of element with at. no. 105 is:

$1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^6 4d^{10} 4f^{14}$,

$5s^2 5p^6 5d^{10} 5f^{14}, 6s^2 6p^6 6d^3, 7s^2$

for $5f$ $(n + l) = 5 + 3 = 8$

for $6d$ $(n + l) = 6 + 2 = 8$

7 **(b)**

Average mass $= (m + 0.5) =$

$$\frac{m \times 4 + (m+1) \times 1 + (m+2) \times 1}{6} = \frac{6m+3}{6}$$

8 **(d)**

$r_n = \frac{r_1 n^2}{Z}$; r_1 is radius of H-atom.

9 **(d)**

According to Bohr model,
Radius of hydrogen atom

$$(r_n) = \frac{0.529 \times n^2}{Z} \text{ Å}$$

Where, n= number of orbit
Z= atomic number

$$r_3 = \frac{0.529 \times (3)^2}{1} = 4.761 \text{Å}$$

10 **(a)**

de Broglie equation is $\lambda = \frac{h}{mu}$

11 **(b)**

$E_3 = E_1 + E_2$ or $\frac{hc}{\lambda_3} = \frac{hc}{\lambda_1} + \frac{hc}{\lambda_2}$

12 **(c)**

e.g., oxygen has O^{16},O^{17} and O^{18} isotopes.

13 **(d)**

Energy order :$5s < 4d < 4f$.

14 **(a)**

$1\text{F} = 10^{-13}$ cm $= 10^{-15}$ m

15 **(b)**

The difference of energy is given out.

16 **(b)**

$E_X > E_{VR} \therefore \lambda_{VR} > \lambda_X$ or X is UV region.

17 **(c)**

According to aufbau principle, as electron enters the orbital of lowest energy first and subsequent electrons are fed in the order of increasing energies. The relative energies of various orbital in increasing order are
$1s,2s,2p,3s,3p,4s,3d,4p,5s,4d,5p,6s,4f,5d,6p,7s$

18 **(b)**

No. of (valence) electrons in $NH_4^+ = 8$,
No. of valence electron in N,(*i.e.*, 5) + No. of e in 4H, (*i.e.*,4) -1(of + ve charge).

20 **(d)**

Hydrogen spectrum is an emission spectrum. It shows the presence of quantized energy levels in hydrogen atom.

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