Atomic Structure Solution

2. (c)

$l = 1$, therefore p orbitals

3. (a)

$1s^2, 2s^2, 2p_x^1 2p_y^1 2p_z^1$ (Pauli's exclusion principle)

5. (b)

$\psi =$ wave function

9. (a)

Atomic number $= 24$

Configuration is [Ar] $3d^5, 4s^1$, n = 6

Total spin $= \pm\frac{1}{2} \times 6 = \pm 3$

Magnetic moment $= \sqrt{n(n+2)} = \sqrt{6(6+2)}$

$= \sqrt{48}$ BM

11. (b, d)

Species having the same number of neutrons are called isotones.

	$^{76}_{32}Ge$	$^{77}_{33}As$	$^{78}_{34}Se$
Neutrons	34	34	34

12. (a, b)

The atomic nucleus contains protons and neutrons.

14. (b, c)

$$E(He^+) = \frac{-13.6 \times 4}{n^2}$$

$n = 2, 3, 4...$ for excited state

15. (a, b)

Exp: Number of dark lines (in absorption), i.e.,

excitation $=$ Number of bright lines (in emission), i.e., de-excitation

It is possible only when the e^- is excited to $n = 2$ from ground state.

Clearly, $\Delta E = 91.8\,eV$ and $40.8\,eV$ are possible:

(Li^{2+}) $(He^{\oplus})$

19. (a)

$$\sqrt{v} = 4.9\times10^7 (Z-0.75) \Rightarrow Z = \frac{\sqrt{v}}{4.9\times10^7} + 0.75$$

[You will get to know about this]

For $\lambda = 9.87\,\overset{o}{A} \Rightarrow v = \frac{c}{\lambda} = \frac{3\times10^8}{9.87\times10^{-10}} = 0.3\times10^{18}$

$$\Rightarrow Zx = \frac{\sqrt{0.3\times10^{18}}}{4.9\times10^7} + 0.75 = 12$$

For $\lambda = 14.6\,\overset{o}{A} \Rightarrow v = \frac{3\times10^8}{14.6\times10^{-10}} = 0.2\times10^{18}$

$$\Rightarrow Z_y = \frac{\sqrt{0.2\times10^8}}{4.9\times10^7} + 0.75 = 10$$

20. 1

$He = 1s^2; n = 1; l = 0; m = 0; s = 1/2, -1/2$

$$\text{Sum} = 1 + \frac{1}{2} - \frac{1}{2} = 1$$