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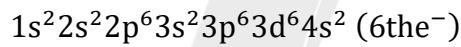
- 1 The electronic configuration of Cr along with the values of the quantum numbers n and ℓ are shown.

	n	ℓ
1 s ²	1	0
2s ²	2	0
2p ⁶	2	1
3s ²	3	0
3p ⁶	3	1
3d ⁵	3	2
4s ¹	4	0

Thus the number of electrons with $\ell = 1$ is 12 and the number of electrons with $\ell = 2$ is 5

- 2 The electrical arrangement of chromium is 1S²2S²2P⁶3S²3P⁶4S¹3d⁵. So subshell's m value is 0, p subshell's m value is 1,0, 1, and d subshell's m value is 2, 1, 0, 1, 2. Consequently, p has 1 orbital with m=0 and 1 d orbital with m=0. Therefore, the total number of electrons will be 2+2+2+2+2+1+1=12.
- 3 The maximum possible set(s) of quantum no. are possible for 6th electron of Fe is 6 .

The electronic configuration of Fe is



For 2p orbital

$$n = 2, l = 1, m = +1, 0, -1$$

The possible number of sets are

$$\Rightarrow n = 2, l = 1, m = +1, s = \pm \frac{1}{2}$$

$$n = 2, l = 1, m = -1, s = \pm \frac{1}{2}$$

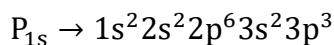
$$n = 2, l = 1, m = 0, s = \pm \frac{1}{2}$$

From the above observation it is obtained that the maximum possible set(s) of quantum no. are possible for 6th electron of Fe is 6 .



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- 4** The electronic configuration is,



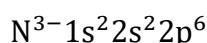
Here, the total number of electron with $n + m + l = 3$ can be given as

2 (for p with $\pm \frac{1}{2}$ spin), +2 (for 3s with $\pm \frac{1}{2}$ spin)

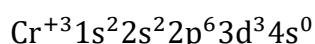
+1 (for 3p as it has only single electron)

5 electrons.

- 5** $Na^+ 1s^2 2s^2 2p^6 3s^0$



$Fe^{+3} 1s^2 2s^2 2p^6 3d^5 4s^0$ (Maximum number of unpaired electron)



- 6** $A \rightarrow S, T; B \rightarrow R, T; C \rightarrow Q; D \rightarrow P, Q$

- 7** $n=1, n=2, n=3$ does not contains f.

- 8** $F \rightarrow (1s^2)(2s^2 2p^5)$

$$\sigma = 6 \times 0.35 + 2 \times 0.85 = 3.8$$

$$Z_{\text{eff}} = 9 - 3.8 = 5.2$$

- 9** 3s, 3p, and 3d subshells are present in the third shell, and the d-subshells can include up to 5 degenerated orbitals.

- 10** $V: 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$

$$\sigma = 0.35 \times 1 + 0.85 \times 8 + 2 \times 1$$

$$= 9.5$$

$$Z_{\text{eff}} = 23 - 9.5 = 13.5$$