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

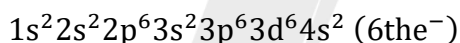
	n	l
$1s^2$	1	0
$2s^2$	2	0
$2p^6$	2	1
$3s^2$	3	0
$3p^6$	3	1
$3d^5$	3	2
$4s^1$	4	0

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

- 2 The electrical arrangement of chromium is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$. 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,
 $P_{1s} \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^3$
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 3p with $\pm \frac{1}{2}$ spin)
+1 (for 3p as it has only single electron)
5 electrons.
- 5 $Na^+ 1s^2 2s^2 2p^6 3s^0$
 $N^{3-} 1s^2 2s^2 2p^6$
 $Fe^{+3} 1s^2 2s^2 2p^6 3d^5 4s^0$ (Maximum number of unpaired electron)
 $Cr^{+3} 1s^2 2s^2 2p^6 3d^3 4s^0$
- 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 $V: 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$
 $\sigma = 0.35 \times 1 + 0.85 \times 8 + 2 \times 1$
 $= 9.5$
 $Z_{\text{eff}} = 23 - 9.5 = 13.5$