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1 The electronic configuration of Cr along with the values of the quantum numbers n and 1 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 $\ell = 1$ is 12 and the number of electrons with $\ell = 2$ 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 6^{th} electron of Fe is 6 .

The electronic configuration of Fe is

$1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2\ (6the^-)$

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 6^{th} 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 39 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 → S, T; B → R, T; C → Q; D → P, Q

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

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

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

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

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: $1s^2 2s^2 2p^6 3s^2\ 3p^6 4s^2 3d^3$

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

$= 9.5$

$z_{eff} = 23 - 9.5 = 13.5$