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1. Statements P and R regarding subshell filling order for a neutral atom are correct

(P) Electrons are assigned to the 4 s subshell before they are assigned to the 3 d subshell

(R) Electrons are assigned to the 4 d subshell before they are assigned to the 5p subshell

The lower energy orbitals are first filled with electrons. Electrons occupy the 4 s orbital first, followed by the 3 d orbital, since the 4 s orbital has a lower energy than the 3 d orbital.

2.

Number	**Symbol**	**Possible Values**
Principal Quantum Number	n	1,2,3,4, ...
Angular Momentum Quantum Number	ℓ	$0,1,2,3,\ldots,(n-1)$
Magnetic Quantum Number	m_1	$-\ell,\ldots,-1,0,1,\ldots,\ell$
Spin Quantum Number	m_s	$+1/2,-1/2$

So, the possible set of quantum numbers for the unpaired electron in the orbital box diagram is

$n=4, l=1, m_l=-1, m_s=+\frac{1}{2}$

3. **Selenium** is a chemical element with symbol Se and atomic number 34 . Classified as a nonmetal, Selenium is a solid at room temperature.

4. According to Hund's rule, the electron configuration with the greatest number of unpaired electrons that all have the same spin in a degenerate orbital is the most stable.

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5. Hint: It is the relation between the quantum numbers of electrons Explanation

Pauli's exclusion principle states that no two electrons in an atom can have all the quantum numbers identical. It means if there are two electrons in a single orbital then they must be of opposite spin. It also implies that one orbital can contain a maximum of two-electron.

Hence, two electrons can't have the same set of quantum numbers according to Pauli's exclusion principle.

6. The quantum numbers of the last electron of $3p^6 3,1,-1,-\frac{1}{2}$

$n = 3$

$l = 1$

$m = -1, 0, +1$

$S = -1/2 \text{ or } +1/2$

Hence the quantum numbers of the last electron of $3p^6 3,1,-1,-\frac{1}{2}$

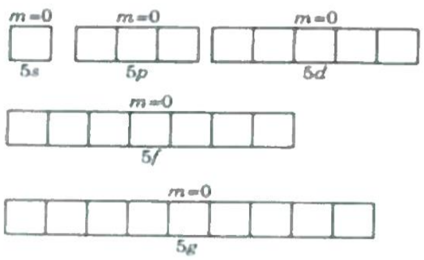
7. The set of quantum numbers which is possible for maximum number of electrons in an atom is $n = 5, m = 0, s = +\frac{1}{2}$

(a) This set represents only single electrons present in 5 s orbitals.

(b) This set represents maximum two electrons present in 5 d orbital.

(c) This set represents one 3s, one 3p and one 3d electron. So maximum 3 such electrons are possible.

(d)



This set represents one 5 s one 5p, one 5 d, one 5 f and one 5 g electron.

So, maximum 5 electrons are possible,

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8. It is also possible to determine how many subshells there are in a primary electron shell by counting the values of the orbital angular number l: $= 0$ when $n = 1$ (I takes on one value and thus there can only be one subshell) $I = 0$ when $n = 2$ and $1(n - 1)$ (I takes on two values and there are two possible subshells)

Also For each value of n, there are are 0 to pm values of m.

9. 2 from 1s, 2 from 2s, 2 from 2p, and 1 from 3 s add up to 7 electrons when $m = 0$ in the sodium atom.

Now we have,

$_{16}S = 1s^2 2s^2 2p^6 3s^2 3p^4$

Here $n + l = 3$ for $2p^6$ and $3\ s^2$ electrons which is for 8 electrons.

The transition metal chromium has an atomic number of 24.

No. of maximum possible electrons When the value of s is positive 1/2, it equals 15 in.

10. For $n = 1$

azimuthal quantum number $= 0,1,2$ i,e s,p,d

no of element $= 18$

in the second row similarly

no of element $= 32$

(b)according to our convention 2^{nd} row and fifth element is nitrogen but according to it it would have atomic number of $18 + 5 = 23$