DPP-04

Only one correct

1. Which of the following statements regarding subshell filling order for a neutral atom is/are correct ?

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

(II) Electrons are assigned to the 4f subshell before they are assigned to the 6 s subshell

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

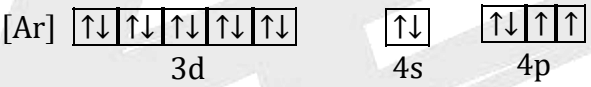
(A) I only (B) II only (C) I and III (D) I, II and III

2. Which is a possible set of quantum numbers for the unpaired electron in the orbital box diagram below ?

(A) $n = 1, \ell = 1, m_\ell = -1, m_s = +1/2$ (B) $n = 4, \ell = 1, m_\ell = -1, m_s = +1/2$

(C) $n = 4, \ell = 2, m_\ell = -2, m_s = +1/2$ (D) $n = 4, \ell = 0, m_\ell = 0, m_s = +1/2$

3. Which element has the following ground state electronic configuration?



(A) Se (B) As (C) S (D) Ge

4. Hund's rule states that the most stable arrangement of electrons (for a ground state electron configuration)

(A) has three electrons per orbital, each with identical spins

(B) has m_ℓ values greater than or equal to +1

(C) has the maximum number of unpaired electrons, all with the same spin in degenerate orbital

(D) has two electrons per orbital, each with opposing spins

5. The Pauli exclusion principle states that

(A) no two electrons in an atom can have the same four quantum numbers

(B) electrons can have either $\pm 1/2$ spins

(C) electrons with opposing spins are attracted towards each other

(D) None of these

6. Choose the correct option for the quantum numbers of the last electron of $3p^6$.

(A) 4,0,0, +1/2 (B) 3,1, −1, −1/2 (C) 4,1,0, $-\frac{1}{2}$ (D) 3,0,1, $\frac{1}{2}$

7. Select set of quantum number which is possible for maximum number of electrons in an atom

(A) $n = 5, \ell = 0, m = 0, s = +\frac{1}{2}$ (B) $n = 5, \ell = 2, m = 0$

(C) $n = 3, m = 0, s = -\frac{1}{2}$ (D) $n = 5, m = 0, s = +\frac{1}{2}$

8. **Statement-1** : For $n = 2$ the values of ℓ may be 0,1 and m may be $0, \pm 1$.

Statement-2 : For each value of n, there are 0 to $(n - 1)$ possible values of ℓ, for each value of ℓ there are 0 to $\pm\ell$ values of m.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

Match the column:

9.

	Column-I		**Column-II**
(A)	No. of electrons in Na(11) having $m = 0$	**(P)**	7
(B)	No. of electrons in S(16) having $(n + \ell) = 3$	**(Q)**	15
(C)	No. of maximum possible electrons having $s = +1/2$ spin in Cr (24)	**(R)**	8
		(S)	12

Subjective

10. Imagine a universe in which the four quantum no. can have the same possible values as in our universe except that azimuthal quantum no. (l) can have integral values from 0,1,2 …. $n + 1$

(a) Find the no. of electron $n = 1$ & 2 shell.

(b) Predict the electronic configuration for elements with atomic no. 15&25 using aufbau $(n + l)$ rule.

ANSWER KEY

DPP-4

1. C **2.** B **3.** A **4.** C **5.** A **6.** B **7.** (D)

8. A **9.** **(A)** −P; **(B)** −R; **(C)** – Q

10. **(a)** 18,32

(b) atomic number $15 = 1\ s^2 1p^6 2\ s^2 1\ d^5$ atomic number $25 = 1\ s^2 1p^6 2\ s^2 1\ d^{10} 2p^5$