INORGANIC CHEMISTRY

DPP
DAILY PRACTICE PROBLEMS

DPP No. 1

Total Marks : 27

Max. Time : 28 min.

Topic : Periodic Table and Periodicity

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Multiple choice objective ('–1' negative marking) Q.5 to Q.6	(4 marks, 4 min.)	[8, 8]
Comprehension ('–1' negative marking) Q.7	(3 marks, 3 min.)	[3, 3]
Subjective Questions ('–1' negative marking) Q.8	(4 marks, 5 min.)	[4, 5]

1. Li resembles Mg due to diagonal relationship which is attributed to :
(A) nearly similar polarising power (B) same value of electron affinity
(C) penetration of sub-shells (D) identical effective nuclear charge

2. Atomic number of 15, 33, 51 represents the following family :
(A) carbon family (B) nitrogen family (C) oxygen family (D) None

3. The element with atomic number Z = 118 will be :
(A) noble gas (B) transition metal (C) alkali metal (D) alkanline earth metal

4. What is the position of the element in the Modern periodic table satisfying the electronic configuration $(n-1)\,d^1\,ns^2$ for n = 4 :
(A) 3rd period and 3rd group (B) 4th period and 4th group
(C) 3rd period and 2nd group (D) 4th period and 3rd group

5.* Which of the following statement(s) is/are correct ?
(A) An element with three electrons in the outer most subshell belongs to nitrogen family.
(B) An element that would tend to lose two electrons belongs to alkaline earth metal group i.e. 2^{nd} group.
(C) An element that would tend to gain two electrons belongs to chalcogen family i.e. 16^{th} group.
(D) 17^{th} group have only non-metals which may exist as solid, liquid as well as gas at room temp.

6.* Which of the following statements are correct ?
(A) In the long form of periodic table, the number of period indicates the value of principal quantum number.
(B) There are four d-block series comprising of total 40 elements in the long form of periodic table.
(C) s-block, d-block and f-block elements are metals.
(D) All p-block elements are non-metal.

7. **Comprehension #**
Read the following comprehension carefully and answer the questions (a) to (c).
Two friends Rohit and John, students of chemistry once discussing on periodic table, reach to a conclusion that because of Aufbau rule and other principles their thoughts are restricted for further discussion on electronic arrangements of atoms. They decided not to obey Aufbau rule and capacity of each orbital is increased to three electrons i.e. instead of two each orbital can take maximum of three electrons. Now on the basis of new arrangement of rohit and john answer the following questions assuming the total no. of elements is 112.

(a). What is the number of elements in third period and fifth period respectively ?
(A) 12, 27 (B) 27, 22 (C) 12, 22 (D) 22, 27

(b). What is the block of the elements with atomic number 9, 28, 44 ?
(A) s, p, d (B) p, s, d (C) p, d, s (D) d, p, s

(c). What is electric configuration of the element with atomic number 43 ?
(A) $1s^2 2s^3 3p^9 3s^3 3p^9 3d^{13}$ (B) $1s^3 2s^3\ 2p^9 3s^3 3p^9 3d^{15} 4s^1$
(C) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 5s^2 4d^2$ (D) $1s^2 2s^3 2p^9 3s^2 3p^9 3d^{15} 4s^1$

8. Total Number of elements which are belong to same period (II).
Li, Na, Mg, F, Ne,Sc, P, Ar

Answer Key

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1.	(A)	**2.**	(B)	**3.**	(A)		**4.**	(D)			
5.*	(ABCD)	**6.***	(ABC)	**7.**	**(a).**	(B)	**(b).**	(C)	**(c).**	(B)	
8.	3										

Hints & Solutions

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1. On descending a group, the atoms and ions increase in size. On moving from left to right the size decreases. Thus on moving diagonally the size remains nearly the same. They also have nearly same polarising powers on account of nearly same charge to size ratio.

2. $Z = 15 = 1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$; so element belongs to p-block. Thus its group number will be 10 + 2 + 3 = 15.
$Z = 33 = 1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^3$; so element belongs to p-block. Thus its group number will be 10 + 2 + 3 = 15.
$Z = 51 = [Kr]^{36}\ 4d^{10}\ 5s^2\ 5p^3$; so element belongs to p-block. Thus its group number will be 10 + 2 + 3 = 15.
Hence, all these elements belongs to 15^{th} group i.e. nitrogen family.

3. $Z = 118\ [Rn]^{86}\ 5f^{14}\ 6d^{10}\ 7s^2\ 7p^6$; as last electron enters in p-subshell, it belongs to p-block. Thus its group number will be 10 + 2 + 6 = 18. Hence the element is a noble gas.

4. When n = 4, the configuration will be $[Ar]^{18}\ 3d^1\ 4s^2$ and thus period is fourth and group no is third.

5.* (A) ns^2np^3, (B) and (C) are correct statements (D) All are non-metals like $\underbrace{F_2, Cl_2}_{\text{gases}}$, $\underbrace{Br_2}_{\text{liquid}}$, $\underbrace{I_2}_{\text{solid}}$

6.* All statements are correct.

7. Na, Mg, Ar