

PERIODIC TABLE

1. MODERN PERIODIC TABLE (MODIFIED MENDELEEV PERIODIC TABLE)

(i) it was proposed by Moseley.

(ii) Modern periodic table is based on atomic number.

(iii) Moseley did an experiment in which he bombarded high speed electron on different metal surfaces and obtained X-rays.

He found out that $\sqrt{\nu} \propto Z$ where ν = frequency of X-rays

from this experiment, Moseley concluded that the physical and chemical properties of the elements are periodic function of their atomic number. It means that when the elements are arranged in the increasing order of their atomic number elements having similar properties gets repeated after a regular interval. This is also known as 'Modern Periodic Law'.

(iv) Modern Periodic Law - The physical & chemical properties of elements are a periodic function of the atomic number.

(v) Characteristics of Modern Periodic Table -

(a) 9 vertical columns called groups.

(b) Ith to VIII group + 0 group of inert gases.

(c) Inert gases were introduced in periodic table by Ramsay.

(d) 7 horizontal series called periods.

2. LONG FORM/PRESENT FORM OF MODERN PERIODIC TABLE

(i) It consists of 7 horizontal periods and 18 vertical columns (groups)

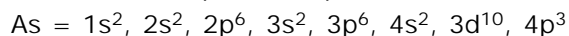
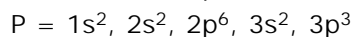
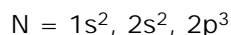
(ii) According to I.U.P.A.C. 18 vertical columns are named as 1st to 18th group.

(iii) The co-relation between the groups in long form of periodic table and in modern form of periodic table are given below.

IA, IIIA, IIIB, IVB, VB, VIB, VIIB,							VIII			IB, IIB, IIIA, IVA, VA, VIA, VIIA 0							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

(iv) Elements belonging to same group having same no. of electrons in the outermost shell so their properties are similar.

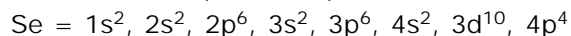
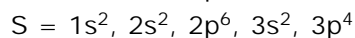
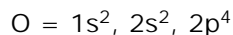
15th/VA/Nitrogen family/Pnicogen : (Used in fertilizer as urea)



General electronic configuration = $ns^2 np^3$

Number of valence shell $e^- = 5$

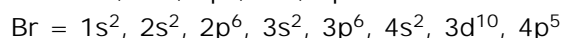
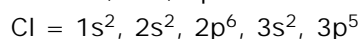
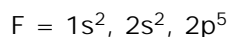
16th/VIA/Oxygen family/Chalcogen : (Ore forming)



General electronic configuration = $ns^2 np^4$

Number of valence shell $e^- = 6$

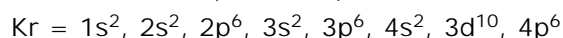
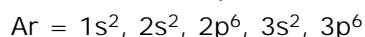
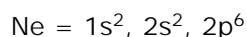
17th/VIIA/Halogen family/Halogens : (Salt forming)



General electronic configuration = $ns^2 np^5$

Number of valence shell $e^- = 7$

18th/Zero group/Inert gases/Noble gases :



General electronic configuration = $ns^2 np^6$ (except. He)

Number of valence shell $e^- = 8$

5. Nomenclature of elements :

(a) IUPAC gave names to elements above atomic No. 100 as follows -

0	1	2	3	4	5	6	7	8	9
nil	un	bi	tri	quad	pent	hex	sept	oct	enn

(b) In all the elements suffix is - ium

e.g.

Atomic No.	IUPAC Name	Symbol
101	Un nil Unium	Unu
102	Un nil bium	Unb
103	Un nil trium	Unt
104	Un nil quadium	Unq
105	Un nil pentium	Unp
106	Un nil hexium	Unh
107	Un nil septium	Uns
108	Un nil octium	Uno
109	Un nil ennium	Une
110	Un un nilium	Uun

- (C) 14 elements in the seventh period (atomic no. = 90 to 103) that are filling 5f subshell
(D) 14 elements in the sixth period (atomic no. = 58 to 71) that are filling 4f subshell
- Q.17 Match the following lists and select the correct answer -
- | | |
|---------------------|--|
| List-I | List-II |
| (a) d-block element | i. $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^1$ |
| (b) Halogen | ii. $1s^2, 2s^2 2p^6, 3s^2 3p^6$ |
| (c) Alkali metal | iii. $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^6, 4s^2$ |
| (d) Noble gas | iv. $1s^2, 2s^2 2p^5$ |
- Code :
- | | | | |
|---------|-----|-----|-----|
| (a) | (b) | (c) | (d) |
| (A) i | ii | iii | iv |
| (B) iii | iv | i | ii |
| (C) i | iii | ii | iv |
| (D) ii | iv | iii | i |
- Q.18 Set containing isoelectronic species is -
(A) C_2^{2+} , NO^+ , CN^- , O_2^{2+}
(B) CO , NO , O_2 , CN
(C) CO_2 , NO_2 , O_2 , N_2O_5
(D) CO , CO_2 , NO , NO_2
- Q.19 Which of the following groups contains metals, non-metals and metalloids -
(A) Group 1 (B) Group 17
(C) Group 14 (D) Group 2
- Q.20 Non-metals belong to -
(A) s-block elements (B) p-block elements
(C) d-block elements (D) f-block elements
- Q.21 Considering the elements B, C, N, F and Si, the correct order of their non-metallic character is -
(A) $B > C > N > F$
(B) $C > B > N > F$
(C) $F > N > C > B$
(D) $F > N > C > B$
- Q.22 The electronegativities of the following elements increase in the order -
(A) $C < N < Si < P$ (B) $N < Si < C < P$
(C) $Si < P < C < N$ (D) $P < Si < N < C$
- Q.23 Considering the elements B, Al, Mg and K, the correct order of their metallic character is -
(A) $B > Al > Mg > K$
(B) $Al > K > B > Mg$
(C) $Mg > Al > K > B$
(D) $K > Mg > Al > B$
- Q.24 According to the Periodic Law of elements, the Variation in properties of elements is related to their ?
(A) Nuclear masses (B) Atomic numbers
(C) Nuclear neutron-proton number ratio
(D) Atomic masses
- Q.25 The reduction in atomic size with increase in atomic number is a characteristic of elements of -
(A) d-block (B) f-block
(C) Radioactive series
(D) High atomic masses
- Q.26 Which one of the following groups represent a collection of isoelectronic species ?
(At. no. Cs = 55, Br = 35)
(A) N^{3-} , F^- , Na^+ (B) Be , Al^{3+} , Cl^-
(C) Ca^{2+} , Cs^+ , Br (D) Na^+ , Ca^{2+} , Mg^{2+}
- Q.27 Which one of the following sets of ions represents the collection of isoelectronic species ?
(A) K^+ , Cl^- , Mg^{2+} , Sc^{3+}
(B) Na^+ , Ca^{2+} , Sc^{3+} , F^-
(C) K^+ , Ca^{2+} , Sc^{3+} , Cl^-
(D) Na^+ , Mg^{2+} , Al^{3+} , Cl^-
- Q.28 Pick out the isoelectronic structure from the following :
I. $^+CH_3$ II. H_3O^+
III. NH_3 IV. CH_3^-
(A) I and II (B) III and IV
(C) I and III (D) II, III and IV
- Q.29 One element has atomic weight 39. Its electronic configuration is $1s^2, 2s^2 2p^6, 3s^2 3p^6 4s^1$. The true statement for that element is -
(A) More (IE)₁ (B) Transition element
(C) Isotone with $^{38}_{18}Ar$ (D) Stable oxide M_2O
- Q.30 The number of paired electrons in oxygen is -
(A) 6 (B) 16 (C) 8 (D) 32

ANSWERKEY

- | | | | |
|-------|-------|-------|-------|
| 1. D | 2. A | 3. B | 4. B |
| 5. B | 6. C | 7. C | 8. C |
| 9. A | 10. C | 11. D | 12. C |
| 13. C | 14. D | 15. D | 16. D |
| 17. B | 18. A | 19. C | 20. D |
| 21. C | 22. C | 23. D | 24. B |
| 25. B | 26. A | 27. C | 28. D |
| 29. C | 30. A | | |