Exercise :5 B

1. a) State the modern Periodic table law.
b) How many periods and groups are there in the modern periodic table

Solution:

a) Modern periodic table states that Physical and chemical properties of elements are a periodic function of their atomic numbers.

b) 18 groups and 7 periods

2. What is the main charecteristics of the last elements in the periods of a periodic table?What is the general name of such elements?

Solution:

Main character of the last element of a periodic table in their outermosy shells are completely filled by either two or 8 electron. These elements are known as Inert gases.

3, What is meant in the periodic table by :
(a) a group, and
(b) a period ?

Solution:

A Group is a set of chemical elements in the same vertical column of the periodic table. The elements in a group have similarities in the electronic configuration of their atoms, and thus they exhibit somewhat related physical and chemical properties.

Horizontal row in a periodic table are called as periods.

4, From the standpoint of atomic structure, what determines which element will be the first and which the last in a period of the periodic table ?

Solution:

From the standpoint of atomic structure, **Atomic number** determines which element will be the first and which the last in a period of the periodic table.

5. (a) What are the following groups known as ?
(i) Group 1 (ii) Group 17 (iii) Group _18 (b) Name two elements of each group.

Solution:

Group 1- alkali metals Ex: Lithium, sodium
Group 17- halogens- Fluorine.Chlorine.
Group 18 – Noble gases Ex: Neon(Ne), Argon(Ar)

6. What is the number of elements in the : (a) 1st period, and (b) 3rd period, of the modern periodic table?

Solution:

a) First period consists of two elements.
b) First period consists of eight elements.

7. How does number of i) Valence elctrons ii) valency vary on moving from left to right
- **a) In the second period of a periodic table**
- **b) In the third period of a periodic table**

Solution:
a)

i) The valence electrons in the same shell (outermost shell) increase progressively by one across the period.

ii) On moving from left to right in a period, valency increases from 1 to 4, then falls to one and ultimately to zero in the last group.

b)
i) Valence electrons in the same shell (outermost shell) increase progressively by one across the period.

ii) On moving from left to right in the third period, valency increases from 1 to 7 and ultimately to zero in the last group.

8. How do atomic structures (electron arrangement) change in a period with increase in atomic numbers, moving left to right.

Solution:

When moving from left to right in a period the size of atoms decreases thus, in a particular period, the alkali metal atoms are the largest and the halogen atoms are the smallest.

9. This question refers to elements of the periodic table with atomic numbers from 3 to 18. In the table below, some elements are shown by letters, even though the letters are not the usual symbols of the elements.

3	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**

a) Which of these is
i) a noble gas
ii) a halogen
iii) an alkali metal
iv) an element with valency 4

b) If A combines with F, what would be the formula of the resulting compound

c) What is the electronic configuration of G

Solution:

a)

i) H and P are noble gases.
ii) G and O are halogens.
iii) A and I are alkali metals.
iv) D and L have valency 4.

b) Li2O. A stand for lithium and F stands for oxygen.

c) Atmoic number of G is 9 Hence electronic configuration is 2,7

10. Sodium and aluminium have atomic numbers 11 and 13, respectively. They are separated by one element in the periodic table, and have valencies I and 3 respectively. Chlorine and potassium are also separated by one element in the periodic table (their atomic numbers being 17 and 19, respectively) and yet both have valency 1. Explain.

Solution:

Na and Al can donate elctron hence their charge will be positive. On the other hand Cl and K can only gain or lose one electron due to which their valency is -1 and +1, respectively.

11. Helium is an unreactive gas and neon is a gas of extremely low reactivity. What, if anything, do their atoms have in common.

Solution

They are unreactive because their valence shells are completely. Helium and Neon have in common that they react under extreme circumsatnces.

12. In which part of a group would you separately expect the elements to have
(a) the greatest metallic character ?
(b) the largest atomic size

Solution:

a) Great metallic character are shown in the elements at the bottom of the group.

b) Largest atomic size can be found in the elements of the lower part of the group.

13. What happens to number of valence electrons in atoms of elements as we go down a group of the periodic table ?

Solution:

valence electrons in atoms of elements remain same as we go down.

14. The position of elements A, B, C, D and E in the periodic table are shown below

Group 1	Group 2	Group 17	Group 18
-	-	-	D
-	B	C	-
A	-	-	E

(a) State which are metals, non-metals and noble gas in this table.
(b) State which is the most reactive (i) metal (ii) non-metal
(c) Which type of ion will be formed by element A, B and C.
(d) Which is larger in size (i) D or E (ii) B or C.

Solution:

a) Metals: A and B; Non-metals: C; Noble gases: D and E

b) Most reactive
(i) Metals: Alkali metals (Group I); Caesium
(ii) Non-metals: Halogens (Group 17); Fluorine

c)
Element A will form a positive ion 1+ (cation).
Element B will form a positive ion 2+ (cation).
Element C will form a negative ion 1- (anion).

d)
i) E
ii) B

15. Write electronic configuration of element $^{35}_{1}T$.
(a) What is the group number of T ?
(b) What is the period number of T ?
(c) How many valence electrons are there in an atom of T?
(d) What is the valency of T ?
(e) Is it a metal or a non-metal ?
(f) State number of protons and neutrons in T.

Solution:

K L M
Electronic configuration = 2, 8, 7
a) VIIA
b) Third period
c) Seven
d) Valency of T = -1
e) Non-metal
f) Protons = 17, Neutrons = 18