Predict which one is 1. Halogen 2. Noble gas element 3. An alkaline earth metal 4. Present in group 14 5. A transition metal 6. A member of group 15.

Sol. (i)  $1s^22s^22p^63s^2$  $\rightarrow$  Period no. – 3, block – s, group – 2

 $\therefore$ 3) it is an alkaline earth metal

(ii)  $1s^22s^22p^5 \rightarrow Period no. -2$ , Block - p, group - 10+7 = 17

 $\therefore$  1) it is a halogen.

(iii) $1s^22s^22p^63s^23p^2 \rightarrow Period$  no.- 3, Block- p, group- 10+4=14

 $\therefore$  4)It is present in group no. 14

(iv)  $1s^22s^22p^63s^23p^6 \rightarrow \text{Period no.} - 3$ , block - p, group - 18

 $\therefore$  (2) it is a noble gas element.

 $(v)1s^22s^22p^63s^23p^63d^24s^2 \rightarrow \text{Period no.} - 4$ , block - d, Group - 2+2 = 4

vi)  $1s^22s^22p^3 \rightarrow$  Period no. – 2, block – p, Group – 10+5 = 15ale. CO. UK  $\therefore$  6) It is a member of group 15. Q.Arrange the following transformed for t

3. N

1. Na, Mg, K 2. N, F, O

Q.Arrange the following invocreasing atomidsize? Of 17

Ans. 1. K>Na>Mg 2. N>O>F 3. P>S>N

#### Q. Out of Fe<sup>2+</sup> and Fe<sup>3+</sup> ions which is smaller in size?

**Ans** Fe<sup>3+</sup> since higher cationic charge means higher will be the nuclear force of attraction which cause more shrinkage in ionic size.

## Q. Consider the elements N, P, O and S and arrange them in order of:

- a. Increasing first inonization enthalpy?
- b. Increasing negative electron gain enthalpy?
- c. Increasing non-metallic character?

## Q. Discuss the factors effecting electron gain enthalpy (electron affinity)?

Ans. 1) Nuclear charge- The negative Electron gain enthalpy increases with increase in nuclear charge. Eg. In case of 2<sup>nd</sup> period Li<B<C<O<F.

properties like atomic size, electronegativity etc.For example. Li - Mg, Be-Al, B-Si have almost similar periodic properties.



#### 4. What is lanthanide contraction? What are its Consequences?

Ans. In lanthanides the valence electrons enter the f-orbitals. Due to the poor shielding effect of f-orbitals and the increased nuclear charge (due to increase in atomic number) attracts valence electrons firmly causing a steady decrease in the size of atom or ion. This contraction of size is significant and is known as lanthanide contraction.

# **CONSEQUENCES-**

- a. There is a steady decrease in the ionic size.
- b. There is a slight increase in electronegativity of the trivalent ions.
- c. The melting points, boiling points and hardness of all the elements increase from Ce to Lu.
- d. Due to this, pairs of elements such as Zr & Hf, Nb & Ta, Mo & Wellonging to 4d and 5d series of elements have almost similar radii.

Q. The amount of energy released when  $1 \times 10^{10}$  roth of chlorine in vapor state are converted to Cl<sup>-</sup> ions according to the relation Cl(g) + Cl(g) is 57.86 x  $10^{-10}$  J 5

Calculate the electron gain enthalpy of Chlorine atom in terms of KJmol<sup>-1</sup> and ev per atom.

Ans.

Amount of energy released when  $1 \times 10^{10}$  Cl atoms converted to Cl<sup>-</sup> = -57.86x10<sup>-10</sup> J

∴ " " "1 Cl-atom " " " Cl<sup>-</sup> =

=- 57.86  $\times$  10<sup>-20</sup> J/atom