

## Atomic number, Mass number, Atomic species

1. (b) The number of electrons in an atom is equal to its atomic number *i.e.* number of protons.
2. (a) No. of protons = Atomic no. = 25 and no. of neutron =  $55 - 25 = 30$ .
3. (b) No. of neutrons = mass number – no. of protons. =  $W - N$ .
4. (b)  $^{70}_{30}\text{Zn}, \text{Zn}^{2+}$  has No. of Neutrons =  $70 - 30 = 40$ .
5. (a)  $\text{Na}^+$  and  $\text{Ne}$  are isoelectronic which contain 10 electrons.
6. (a) One molecule of  $\text{CO}_2$  have 22 electrons.
7. (c)  $\text{Cl}$  and  $\text{Cl}^-$  differs in number of electrons.  $\text{Cl}$  has  $17e^-$  while  $\text{Cl}^-$  has  $18e^-$ .
8. (b)  $\text{CO}$  and  $\text{CN}^-$  are isoelectronic.  
 $\text{CO} = 6 + 8 = 14$  and  $\text{CN}^- = 6 + 7 + 1 = 14$ .
9. (c) Mass of an atom is due to nucleus (neutron + proton).
10. (b) Atomic number is defined as the number of protons in the nucleus.
11. (b)  $^{56}_{26}\text{Z} \rightarrow X$   $A = P + N = Z + N = E + N$   
 $N = A - E = 56 - 26 = 30$
12. (c) Most probable radius =  $a_0 / Z$   
 where  $a_0 = 52.9 \text{ pm}$ . For helium ion,  $Z = 2$ .  
 $r_{\text{mp}} = \frac{52.9}{2} = 26.45 \text{ pm}$ .



13. (b) Four unpaired electron are present in the  $Fe^{2+}$  ion  $Fe_{26}^{2+} = [Ar]3d^6, 4s^0$
14. (c)  $Na^+$  has 10 electron and  $Li^+$  has 2 electron so these are different number of electron from each other.
15. (b) Positively charged
16. (c)  $P_{15} = 2, 8, 5$
17. (c)  $8O = 1s^2 2s^2 2p^4$
18. (a)  $35Br^{80} = 1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^5$   
 $A = 80, Z = 35, N = ?$   
 $N = A - Z = 80 - 35 = 45$   
 atomic number (Proton) is 35 and no. of neutron is 45.
19. (c)  ${}^{16}_8O^{--}$  have more electrons than neutron  $p = 8, e = 10, n = 8$ .
20. (a)  $6 \rightleftharpoons A^{12}$  and  $6 \rightleftharpoons X^{13}$  both are isotopes but have different no. of neutrons.  
 $6A^{12}$ , For A have  $p = 6, e = 6$  and  $n = 6$  and  
 $6X^{13}$ , For B have  $p = 6, e = 6$  and  $n = 7$
21. (c)  $P = 20$ , mass no. (A) = 40  
 $N = A - P = 40 - 20 = 20$   
 $P = N = 20$ .
22. (b) Electrons in  $Na^+ = 11 - 1 = 10$   
 Electrons in  $Mg^{2+} = 12 - 2 = 10$
23. (c)  $20 \rightleftharpoons Ca^{40}$  has 20 proton, 20 neutron.
24. (d)  $CH_3^+ = 6 + 3 - 1 = 8e^-$ ,  
 $H_3O^+ = 3 + 8 - 1 = 10e^-$ ,  
 $NH_3 = 7 + 3 = 10e^-$ ,  $CH_3^- = 6 + 3 + 1 = 10e^-$

