Solution:

Exercise :4 B

1. (a) Name the three fundamental particles of an atom.
(b) Give the symbol and charge of each particle. 2, Complete the table given below by identifying P, Q, R and S.

Solution:

a) Electrons, protons and neutrons are the three fundamental particles of an atom.

b)

Particle	Symbol	Charge
Electron	e	-1
Proton	P	+1
Neutron	n	No charge

2. Complete the table given below by identifying P, Q and R

Element	**Symbol**	**No of Protons**	**No of Neutrons**	**No of Electrons**
Sodium	$^{23}_{11}Na$	**11**	**P**	**11**
Chlorine	$^{35}_{17}Cl$	**Q**	**18**	**17**
Uranium	**R**	**92**	**146**	**92**
S	$^{19}_{9}F$	**9**	**10**	**9**

Solution:

P- 12
Q-17
R- $^{238}_{92}U$

3. The atom of an element is made up of 4 protons, 5 neutrons and 4 electrons. What are its atomic number and mass number ?

Solution:

Atomic number = Number of protons or number of electrons = 4
Mass number = Number of protons + Number of neutrons = 4 + 5 = 9

4. The atomic number and mass number of sodium are 11 and 23 respectively. What information is conveyed by this statement?

Solution:

Atomic number (11) of sodium conveys information that the number of protons and electrons is the same.
Mass number (23) of sodium indicates the sum of protons and neutrons.

5. Write down the names of the particles reptcsented by the following symbols and explain the meaning of superscript and sub;cript numbers attached.

1 0
1 n e
P, O, -1
1

Solution:

p = proton
n = neutron
e = electron
Top Superscript number: These superscript number show their mass number
Bottom Subscript number: These numbers show their atomic number

6. From the symbol $^{24}_{1}Mg$ state the mass number, the atomic number and electronic configuration of magnesium.

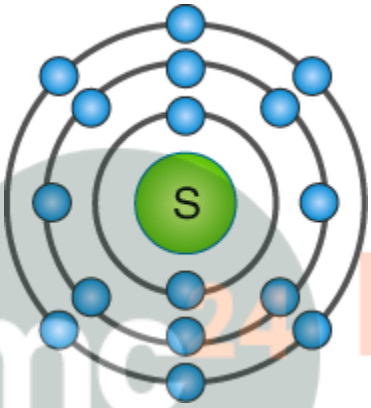
Solution:
Mass number = 24
Atomic number = 12
No. of electrons = 24 - 12 = 12
Electronic configuration = 2, 8, 2

7. Sulphur has an atomic number 15 And mass number of 32.

State the number of protons and neutron in the nucleus of sulphur. Give a simple diagram to show the arrangement of electrons in an atom of sulphur.

Solution:

Atomic number = 16
Atomic mass = 32
Number of protons = 16
Number of electrons = 16
Number of neutrons = 32 - 16 = 16
Electronic configuration = 2, 8, 6



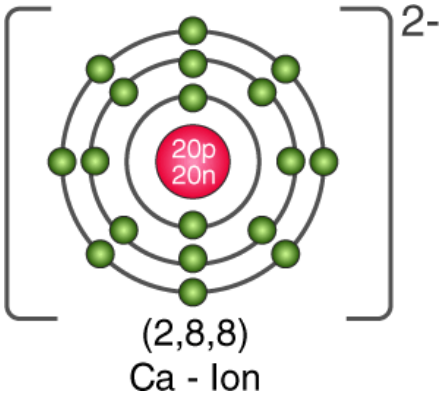
8. Explain the rule according to which electrons are filled in various energy levels.

Solution:

i) The maximum capacity of a shell to accommodate electrons is given by the general formula $2n^2$, where n is the serial number of a shell.
ii) The maximum number of electrons possible in the outermost shell is 8, and that in the penultimate shell is 18.
iii) It is not necessary for an orbit to become completed before another is formed. In fact, a new orbit is formed when the outermost shell attains 8 electrons.

9. Draw the orbital diagram Ca^{+2} ion and state the number of three fundamental particles present in it

Solution:



Number of three fundamental particles of Ca2+:
Protons: 18
Electrons: 18
Neutrons: 40 - 18 = 22

10. Write down the electronic configuration of the following:

a $^{27}_{13}X$ **b)** $^{35}_{17}$

Write down the number of electrons in X and neutrons in Y.

Solution:

a) Electronic configuration: 2, 8, 3
Number of electrons = 13
Number of neutrons= 27-13= 14

b) Electronic configuration: 2, 8, 7
Number of electrons = 17
Number of neutrons= 35-17= 18