SHIKSHA CLASSES

Subject : Science **ANSWER PAPER** **Total Marks : 30**

Class : IX **4. Structure of the Atom**

Section A(Each 1 marks)

Q.1) If k and L shells of an atom are full, then what would be the total number of electrons in atom.

Ans : d) 10

OR

Covalency is the number of electrons.

Ans : a) Sharing with other atoms

Q.2) An atom has atomic number 13, what is its valency and name the element?

Ans : Aluminium - 2, 8, 3, valency is 3.

OR

What is an atomic number?

Ans : Atoms of different elements which contains the same number of neutron. eg.

$${}^{14}_{6}C,\ {}^{15}_{7}N,\ {}^{16}_{8}O$$

Q.3) Assertion (A) : All isotopes of a given element show the same type of chemical behaviour.

Reason (R) : The chemical properties of an atom are controlled by the number of electrons in the atom.

Ans : a) Both A and R are true, and R is correct explanation of the assertion.

Q.4) Assertion(A): Atom is electrically neutral.

Reason(R): A neutral particle, neutron is present in the nucleus of atom.

Ans : b) Both A and R are true, but R is not the correct explanation of the assertion.

Q.5) Assertion(A): Electrons moving in the same orbit will lose or gain energy.

Reason(R): On jumping from higher to lower energy level, the electron will gain energy

Ans : d) A is false, but R is true

Q.6) The electronic configuration of chlorine is

Ans : c) 2, 8, 7

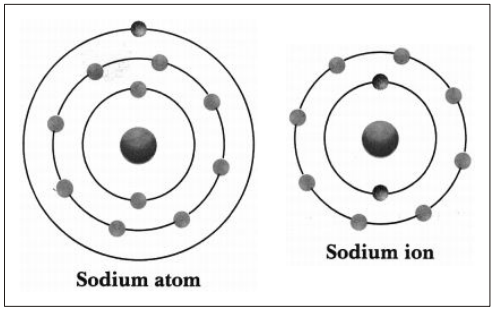
OR

Give two important applications of radioactive isotopes.

Ans : 1) An isotope of carbon-12, C^{14}, is used in carbon dating.

2) U^{235} is used in the nuclear reactors to generate electricity

Q.7) **Observe the following electronic configuration of sodium and answer any two question from 5(i) to 5(iii)** **(2)**



i) What is the atomic number of sodium?

Ans : a) 11

ii) In sodium ion figure how many electrons are present?

Ans : a) 11

iii) Charge on the sodium is ------

Ans : a) Positive

Q.8) Match column A with column B.

Column A	Column B
Atomic number	Valency
(A) 12	(i) 3
(B) 17	(ii) 0
(C) 10	(iii) 2
(D) 15	(iv) 1

Ans : b) A - iii, B - iv, C - ii, D - i

Q.9) Identify the decreasing order of specific charges of the particles: Electron(e), proton(p), neutron(n) and a particle.

Ans : c) e, p, a, n

Q.10) The correct electronic configuration of potassium is _____?

Ans : d) 2, 8, 8, 1

Q.11) The ion of an element has 3 positive charges. Mass number of the atom is 27 and the number of neutrons is 14. What is the number of electrons in the ion?

Ans : b) 10

Q.12) An atom with 3 protons and 4 neutrons will have a valency of

Ans : c) 1

Q.13) Which of the following statement is always correct?

Ans : a) An atom has equal number of electrons and protons.

Q.14) The nucleons are

Ans : c) Protons and neutrons

Section B (Each 2 marks)

Q.15) An element 'X' contains 6 electrons in 'M' shell as valence electrons. What is the atomic number of 'X'?

Ans : If 'X' contains 6 electrons in 'M' shell as valence electrons, then the electronic configuration of 'X' is K = 2, L = 8, M = 6 Atomic number = 16.

OR

Predict the valency of the following elements

i) A (Atomic number 5) **ii) B (Atomic number 12)**

iii) C (Atomic number 14) **iv) D (Atomic number 17)**

Ans : i) Valency of element 'A' = 8 – 5 = 3

ii) Valency of element 'B' = 12 – 10 = 2

iii) Valency of element 'C'= 14 – 10 = 4

iv) Valency of element 'D'= 18 – 17 = 1

Q.16) The atomic number of lithium is 3. Its mass number is 7.

a) How many protons and neutrons are present in a lithium atom?

b) Draw the diagram of a lithium atom.

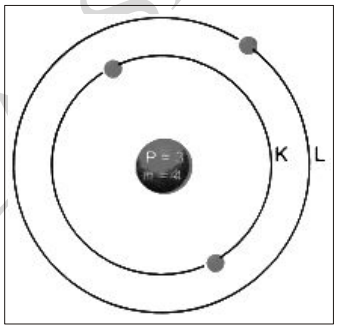
Ans : a) Number of neutrons = Mass number – atomic number

Number of neutrons = 7 – 3 = 4

Number of protons = atomic number

Number of protons = 3

b) Structure of a lithium atom



Section C(Each 3 marks)

Q.17 : Write the conclusions drawn by Rutherford when he observed the following :

i) Most of the a - particles passing straight through the gold foil.

Ans : Most of the space inside the atom is empty because most of the a-particles passed through the straight line through the gold foil.

ii) Some a-particles getting deflected from their path.

Ans : Very few particles were deflected from their path, indicating that the positive charge of the atom occupies very little space.

iii) Very small fraction of a- particles getting deflected by 180^0.

Ans : Indicating that all the positive charge and mass of the gold atom were concentrated in a very small volume within the atom.

OR

Atomic mass of aluminium is 27 u and the atomic number is 13, find the number of protons and number of neutrons in aluminium.

Ans : Atomic number = 13

So, number of proton = 13

Atomic mass (Mass number) = Number of protons + number of neutrons

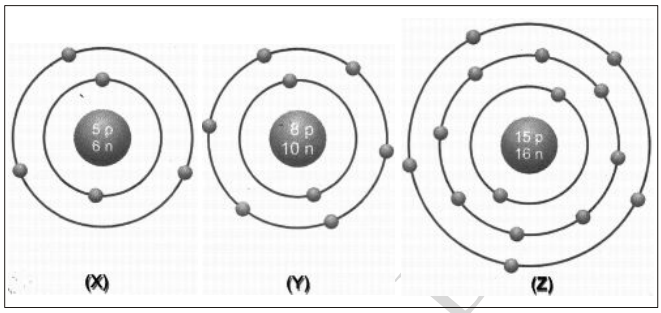
Let the number of neutron be 'n'

27 u = 13 + n

n = 27 – 13 = 14

So, number of proton = 13 and number of neutron = 14

Q.18) What information do you get from the figures about the atomic number, valency of atoms X, Y and Z? Give your answer in a tabular form.



Ans :

	Atomic No.	Mass No.	Valency
X	5	11	3
Y	8	18	2
Z	15	31	3.5

Section D(5 marks)

Q.19) i) What is an octet rule? How do elements are in an octet?

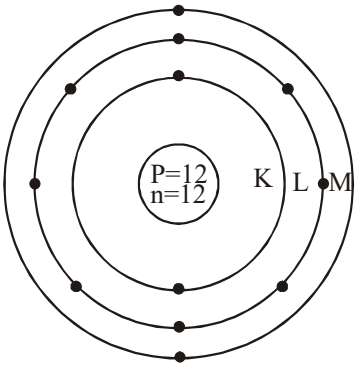
Ans : The Possessing of 8 electron in the outermost shell for making the shell fully filled is called Octet. Elements attain their octet by sharing, gaining or losing electron.

: ii) Make a schematic atomic structure of magnesium and phosphorus.

(Given number of Protons of magnesium = 12 and that of phosphorus=15)

$_{12}Mg$ =

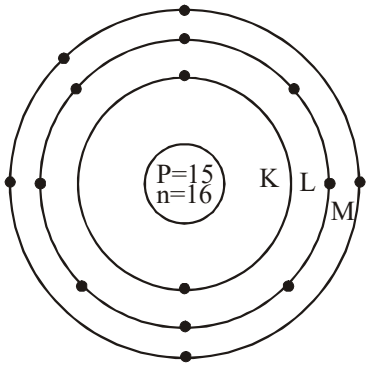
K	L	M
2	8	2



: ii) Atomic Structure of Phosphorous.

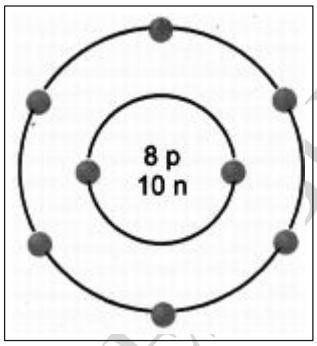
Ans :

	K	L	M
$_{15}P$ =	2	8	5



OR

The given figure depicts the atomic structure of an atom of an element 'X'. Write the following information about the element 'X'.



a) Atomic number of 'X'
b) Atomic mass of 'X'
c) Valence electrons
d) Valency of 'X'
e) 'X' should be metal or non-metal.

Ans :

a) Atomic number = Number of protons = 8

b) Atomic mass = Number of protons + Number of neutrons
= 8 + 10 = 18 u

c) Valence electrons = 6

d) Valency of 'X' = 8 – 6 = 2

e) 'X' should be non-metal because there are six valence electrons hence it will take two more electrons to complete its outermost shell.

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