



III. Short Answer Type Questions

Question 1. Name the scientist who discovered protons and neutrons in an atoms.

Answer: Protons were discovered by E. Goldstein in 1866 and neutrons were discovered by J, Chadwick in 1932.

Question 2. What is the contribution of Bohr and Bury together in the structure of atom's explanation?

Answer: Both Bohr and Bury gave the distribution of electrons into different atoms by giving the formula $2n^2$, where n = shell number.

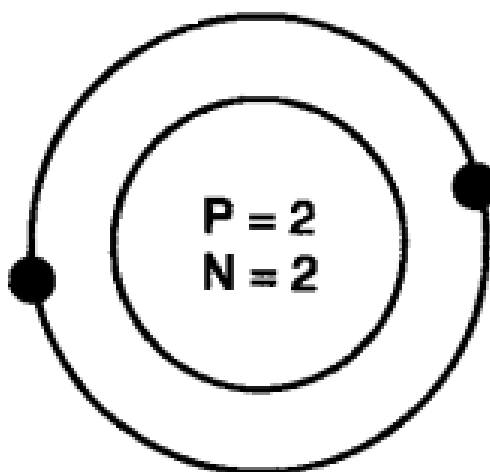
Question 3. Draw the atomic structure of (i) an atom with same number of sub-atomic particles, (ii) an atom with same number of electrons in L and M shell.

Answer: (i) An atom with same number of sub-atomic particles is ${}^2_4\text{He}$

No. of protons = 2

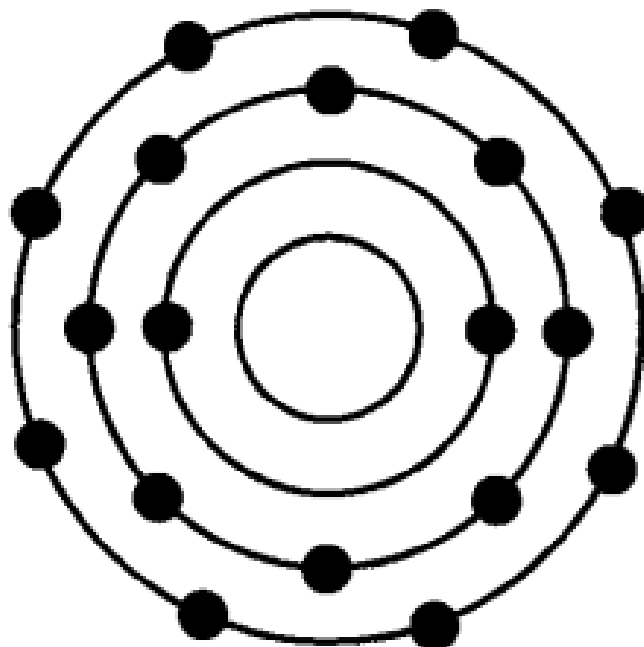
No. of electrons = 2

No. of neutrons = 2



Helium atom

(ii) An atom with L and M shell filled ---->K L M- 2 8 8



Argon

Question 4. What is an octate? Why would atoms want to complete their octate?

Answer: When the outermost shell of an atom i.e., L, M or N are completely filled with 8 electrons in the shell, it is said an octate. Atoms would want to complete their octate because they want to become stable.

Question 5. Find the valency of $^{14}_7\text{N}$ and $^{35}_{17}\text{Cl}$.

Answer: The atomic number of nitrogen = 7, No. of protons = 7, No. of electrons = 7

Electronic configuration = K L M = 2 5 -

Valency = 3

Because either it will gain three electrons or share 3 electrons to complete its octate.

The atomic number of chlorine = 17, p = 17, e=17

Electronic configuration = K L M = 2 8 7

Valency = 1

Because it will gain 1 electron to complete its octate.

Question 6. Pick up the isotopes among the following and state reason.



Answer: The isotopes are $^{35}_{17}\text{X}$ and $^{37}_{17}\text{X}$ as both the atoms show same atomic number but different mass number.

Question 7. Pick up atoms which have same number of neutrons from the following:



Answer:

$^{23}_{11}\text{Y}$ and $^{24}_{12}\text{Y}$ – have same number of neutrons, 12 in each.

$^{28}_{14}\text{Y}$ and $^{27}_{13}\text{Y}$ – have same number of neutrons, 14 in each.

Question 8. What are nucleons? What is the name given to those atoms which have same number of nucleons in it?

Answer: Protons and neutrons present in the nucleus are called

nucleons Isobaric elements have same number of nucleons in it.

<i>E.g.,</i>	Element	Protons	Neutrons	(Protons + Neutrons)
	Argon	18	22	40
	Calcium	20	20	40
	Potassium	19	21	40

Question 9. Give the difference between three sub-atomic particles.

Answer: Three sub-atomic particles are electron, proton and neutron

Particle	⇒	Electron	Proton	Neutron
Discovered by	⇒	J.J. Thomson	E. Goldstein	J. Chadwick
Charge	⇒	- 1	+ 1	0
Symbol	⇒	<i>e</i>	P	<i>n</i>
Mass	⇒	$\frac{1}{1800}$	1	1

Question 10. Give the names of three atomic species of hydrogen.

Answer: Three atomic species of hydrogen are:

Name	Protium ${}^1_1\text{H}$	Deuterium ${}^2_1\text{H}$	Tritium ${}^3_1\text{H}$
Symbol	${}^1_1\text{H}$	${}^2_1\text{H}$	${}^3_1\text{H}$
Protons	1	1	1
Atomic no.	1	1	1
Neutrons	0	1	2

Question 11. Atomic Mass exists as whole number, why do we write the atomic mass of chlorine as 35.5 u.

Answer: Chlorine has two isotopes and the mass of an atom is taken as the average mass of all the naturally occurring atoms of that element.

This is obtained by knowing the percentage of each isotopic form and then the average mass is calculated $\text{Cl} = 35 - 75\%$ and $\text{Cl} = 37 - 25\%$

$$\therefore \left(35 \times \frac{75}{100} \right) + \left(37 \times \frac{25}{100} \right)$$

$$\frac{105}{4} + \frac{37}{4} = \frac{142}{4} = 35.5 \text{ u}$$

Question 12. Give difference between isotopes, and isobars.

Answer:

Isotopes	Isobars
<ul style="list-style-type: none"> • Are atoms of same element • Have same atomic number • Have different mass number • Number of protons and electrons are same in these atoms. 	<ul style="list-style-type: none"> • Are atoms of different element • Have different atomic number • Have same mass number • Number of protons and electrons are not same in these atoms.

Question 13. Number of protons and electrons are same in an atom. Then why is it wrong to say that atomic number of an atom is equal to its number of electrons.

Answer: Atomic number \neq Number of electrons, although number of protons = number of electrons because the electron's number can change in an atom by loss, or gain of it. But the proton's number remain constant (as it does not take part in loss or gain).

Question 14. An atom is electrically neutral, on loss or gain of electrons why does it become charged?

Answer: An atom is electrically neutral because of same number of protons and electrons. But it becomes charged, to become stable atom, loses or gains electrons. Hence,

Number of protons \neq Number of electrons

If it loses electrons $p > e$; hence +ve charge is obtained.

If it gains electrons $e > p$; hence -ve charge is obtained.

Question 15. What is valency? Explain different types of valencies.

Answer: The combining capacity of an atom is called its valency.

There are 2 types of valencies.

Covalency	Electrovalency
• When an atom share electrons have combining capacity.	When an atom loses or gains electrons.

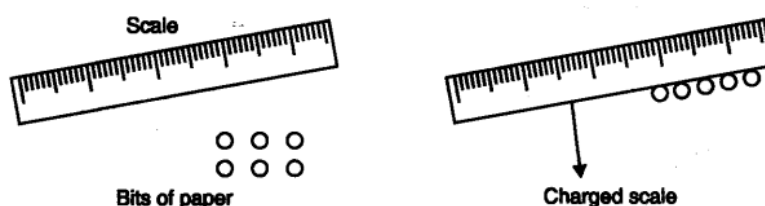
Some atoms also show zero valency when there outermost shell is completely filled.

Question 16. With the help of an activity in daily life, how can you prove that atoms are divisible.

Answer: Activity

- Take a scale, rub it on hair, try to attract a small bit of paper.
- Now divide the bit of paper further into smaller pieces.
- Again bring the charged scale near to this pieces of papers.
- You will observe that the bits of paper still get attracted.

Conclusion: This activity shows that atom contains charges and these charges are opposite in nature which shows the attraction. Hence here scale and paper both are oppositely charged and hence attract each other. Also, every atom has at least one sub-atomic particle.



Question 17. In the structure of an atom why are protons present in the centre and are not pulled outside by the electrons as both are oppositely charged with same unit of charge?

Answer: Protons are heavy with mass 1 unit and hence are concentrated in the centre

of the atom. The mass of electrons is negligible i.e. $1/1800$ times less than that of protons. Hence are not able to attract the protons and pull them out of the nucleus, although their charge is of same value.

Question 18. According to you, among the structure of atom studied which model is correct and why?

Answer: Bohr's model of an atom is the best model and is correct because it gives the explanation of nucleons (protons and neutrons) in the centre and how electrons revolve around the nucleons in their discrete, special orbits, so electrons don't loose/radiate energy and remain bonded in their shell.

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