

CHEMISTRY
Paper : (Objective type)
Minutes
Maximum Marks:- 12

-019 (Class 9th)

Time Allowed:- 15

Note:- Write answers to the questions on the objective answer sheet provided. Four possible answers A,B,C and D to each question are given. Which answer you consider correct, fill the circle in front of A,B,C or D with Marker or Pen ink to each question on the answer sheet provided.

Q.1	QUESTIONS	(A)	(B)	(C)	(D)
1.	Quantum means	Variable energy	Fixed energy	High energy	Minimum energy
2.	Which isotope is used for diagnosis of goiter?	Iodine-131	Cobalt-60	P-32	Sr-90
3.	Which radio isotope is used for the diagnosis of tumor in the body?	Cobalt-60	Iodine-131	Strontium-90	Phosphorous -30
4.	The concept of orbit was used by.	J.J.Thomson	Rutherford	Bohr	Planck
5.	Canal rays were discovered by	Goldstein	Thomson	Dalton	Crooks
6.	Which element has $1s^1, 2s^1, 2p^1$ electronic configuration?	B	C	N	O
7.	The value of Planck's constant is	6.63×10^{-34} Js	6.63×10^{24} Js	6.62×10^{-19} Js	6.62×10^{-12} Js
8.	Which electronic configuration of Boron is	$1s^2, 2s^1$	$1s^2, 2s^2$	$1s^2, 2s^2, 2p^1$	$1s^2, 2p^1$
9.	Deuterium is used to make	Light water	Heavy water	Soft water	Hard Water
10.	Plum pudding theory was put forward.	Thomson	Goldstein	Crooks	Soddy
11.	The scientist who presented the concept of Orbit around the molecule is.	Planks	Bohr	Rutherford	J.J.Thomson
12.	The percentage of pure U is found in nature.	97%	98%	99%	100%

A B C D	A B C D	A B C D	A B C D	A B C D
1 ☐ A ☒ B ☐ C ☐ D	4 ☐ A ☐ B ☒ C ☐ D	7 ☒ A ☐ B ☐ C ☐ D	10 ☒ A ☐ B ☐ C ☐ D	13 ☐ A ☐ B ☐ C ☐ D
2 ☒ A ☐ B ☐ C ☐ D	5 ☒ A ☐ B ☐ C ☐ D	8 ☐ A ☐ B ☒ C ☐ D	11 ☐ A ☒ B ☐ C ☐ D	14 ☐ A ☐ B ☐ C ☐ D
3 ☐ A ☒ B ☐ C ☐ D	6 ☐ A ☒ B ☐ C ☐ D	9 ☐ A ☒ B ☐ C ☐ D	12 ☐ A ☐ B ☒ C ☐ D	15 ☐ A ☐ B ☐ C ☐ D

نوٹ: معروضی سوال نامے کو توجہ سے پڑھیں اور ہر MCQ کی درست آپشن A,B,C,D کو پین کی سیاہی یا مارکر سے اس طرح پُر کریں کہ سیاہی دائرے سے باہر نہ نکلے۔ ایک سے زیادہ دائروں کو پُر کرنے یا کٹ کر پُر کرنے کی صورت میں مذکورہ جواب غلط تصور ہوگا۔

TEST NO.2

CH-2

CHEMISTRY

Hours

Paper: I (Essay Type)

48

(Class 9th)-019

Time Allowed: 1:45

Maximum Marks:

(PART-I)

2. Write short answers to any FIVE (5) questions:

- (i) How does electron differ from a neutron?
- ii) State four uses of Isotopes.
- iii) Differentiate between shell and sub shell.
- iv) State properties of positive rays.
- v) Give two characteristics of cathode rays.
- vi) Write down the electronic configuration of Cl ion.
- vii) What is the nature of charge of cathode rays?
- viii) A patient has goiter; how will it be detected.

10

3. Write short answers to any FIVE (5) questions:

- i) α - particles measured by Rutherford in his experiment what was the source of these particle.
- ii) What are the defects of Rutherford's atomic model?
- iii) Define plum pudding model. Who presented it?
- iv) Write three properties of neutrons.
- v) What is Dalton's atomic theory?
- vii) What is meant by Quantum?
- viii) What is the classical theory of radiation? How does it differ from quantum theory?

10

4. Write short answers to any FIVE (5) questions:

- i) How is the goiter in thyroid gland detected?
- ii) Define nuclear fission reaction.
- iii) Write two differences between Rutherford and Bohr's atomic theory.
- iv) How are cathode rays produced?
- v) Write two postulates of Bohr's atomic model.
- vi) Write down the isotopes of carbon.
- vii) How the electrons of Na_{11} are distributed in different shells?
- viii) Why do isotopes of an element have similar chemical properties?

10

(PART - II)

Note: - Attempt any TWO questions.

- Q.5 a) Explain isotopes with examples and write down any two uses of radioactive isotopes. **5**
b) Describe Rutherford's atomic model. Also state the observation made by Rutherford. **4**

- Q.6 a) Write down the properties of Canal Rays. **5**
b) Write a note Shell and Subshell? **4**

- Q.7 a) Write five characteristics of cathode rays. **5**
b) State the postulates of Bohr's atomic model. **4**

CHEMISTRY

(PART - I)

Question : 2

Write short answers to any five questions:

(i) How does electron differ from a neutron?

Electrons

1- Electron is the negative charged particle.

2- Electron revolves around the nucleus.

3- Mass of electron is 5.486×10^{-4} amu.

Neutrons

Neutron is the neutral particle.

Neutron is present in the nucleus.

Mass of neutron is 1.0087 amu.

(ii) State four uses of isotopes.

Uses of Isotopes :-

1- Radiotherapy.

2- Tracer for diagnosis and medicine.

3- Archaeological and geological uses.

4- Chemical reaction and structure determination.

5- Applications in power generation.

(iii) Differentiate between shell and sub shell.

Shell

1. The shells are sub divided into sub shell.
2. The fixed circular orbits which is associated with a definite amount of energy is called shell.
3. K, L, M, N etc. are considered as shell.

Sub-shell

- The sub-shells are also ^{composed} themselves of atomic orbitals.
- Each shell is composed of one or more sub shells.
- s, p, d, f are considered as the sub-shells.

(iv) State properties of positive rays.
Properties of positive rays :-

1. These rays travel in a straight line in a direction opposite to cathode rays.
2. The nature of positive rays depends upon the nature of gas present in discharge tube.
3. The positive rays produced by using hydrogen gas are known as protons.

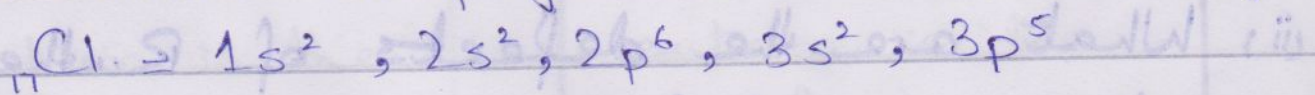
(v) Give two characteristics of cathode rays.

Cathode rays have following characteristics.

- 1- These rays travel in a straight line perpendicular to the cathode surface.
- 2- They produced light when they hit the sides of the discharge tube.

(Vi) Write down the electronic configuration of Cl ion.

Chlorine has atomic number 17, its electronic configuration is following:



(Vii) What is the nature of charge "of" on cathode rays?

Nature of charge on Cathode rays:-

Cathode rays are negatively charged.

(Viii) A patient has goiter; how will it be detected?

Isotopes of iodine - 131 are used for diagnosis of goiter in thyroid gland.

Question : 3

Write short answers to any five questions:

(ii) α - particles measured by Rutherford in his experiment what was the source of these particles.

Alpha particles are emitted by radioactive elements like radium and polonium. These are actually helium nuclei (He^{2+}). They cannot penetrate through matter to some extent.

(iii) What are the defects of Rutherford's atomic model?

1- According to classical theory, electrons being the charged particles should release or emit energy continuously and they should ultimately fall into the nucleus.

2- If the electrons emit energy continuously they should form a continuous spectrum but in fact, line spectrum was observed.

(iii) Define plum pudding model. Who presented it?

J.J Thomson put forth this "plum pudding" theory.

According to this theory atoms are solid structures of positive charge

with tiny negative particles stuck inside. It is like plums in the pudding.

(iv) Write three properties of neutrons.

Properties of Neutrons:-

- 1- Neutrons carry no charge.
- 2- They are highly penetrating.
- 3- Mass of neutron is nearly equal to the mass of proton.

(v) What is Dalton's atomic theory?

Dalton's atomic theory:-

According to it.

- 1- All matter is made up of very small indivisible particles called atoms.
- 2- An atom is indivisible, hard, dense sphere.
- 3- Atoms of same element are alike.
- 4- They combine in different ways to form compounds.

(vi) Write use of Co-60.

Cobalt-60 emits strongly penetrating gamma rays and hence used for cancer affecting within the body.

(vii) What is meant by Quantum?

Quantum :-

Quantum means fixed energy. It is the smallest amount of energy that can be emitted or absorbed as electromagnetic radiation. Quanta are plural of quantum.

Viii) What is the classical theory of radiation? How does it differ from quantum theory?

Classical Theory

According to it, electrons being the charged particles should release or emit energy continuously and they should ultimately fall into the nucleus.

Quantum Theory

Quantum is the smallest amount of energy that can be emitted or absorbed as electromagnetic radiation. According to this theory electrons do not lose energy while moving in any particular orbit. They gain or lose energy when they change the orbit.

Question : 4

Write short answers to any

five questions:

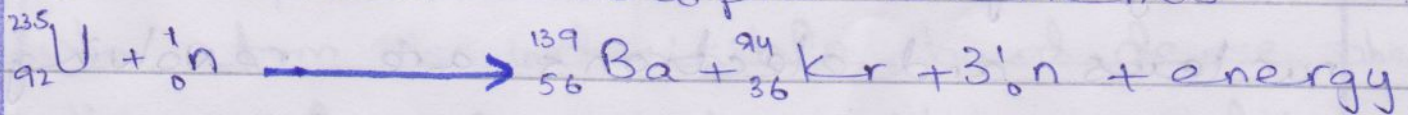
(i) How is the goiter in thyroid gland detected?

Isotope of Iodine - 131 is used for diagnosis of goiter in the thyroid gland.

(ii) Define nuclear fission reaction.

Nuclear Fission Reaction:-

Nuclear fission is the type of nuclear reaction in which a radioactive element (${}_{92}^{235}\text{U}$) is bombarded with slow moving neutrons that isotope of element emits three neutrons and split into some other isotopic elements.



(iii) Write two differences between Rutherford and Bohr's atomic theory.

Rutherford's Atomic Theory

It was based upon classical theory.

Electrons revolve around the nucleus.

Atoms should collapse.

Bohr's Atomic Theory

It was based upon quantum theory.

Electrons revolve around nucleus in orbits.

Atom should not collapse.

(iv) Why positive rays are called canal rays?

In 1886 Goldstein found that positive rays passed through holes present in the cathode and produced a glow on the walls of the discharge tube. He called these rays as "canal rays".

Q) Write two postulates of Bohr's atomic model.

The Bohr's atomic model was based upon the following postulates:

1. Each orbit has a fixed energy that is quantized.
2. The hydrogen atom consists of a tiny nucleus and electrons are revolving in one of circular orbits of radius r around the nucleus.

(vi) Write down the isotopes of carbon.

There are two stable isotopes of carbon ^{12}C and ^{13}C and one radioactive isotope ^{14}C .

(vii) How the electrons of Na are distributed in different shells?

The electronic configuration of sodium will be written in ^{shell} as

K L M

2, 8, 1

Further distribution of electrons in sub shells will be : $1s^2, 2s^2, 2p^6, 3s^1$

(Viii) Why do isotopes of an element have similar chemical properties?

Isotopes have similar chemical properties because these depend upon electronic configuration and isotopes have same electronic configuration, and number of protons.

(PART - II)

Attempt any two questions.

Question : 5(a)

Explain Isotopes with examples and write down any two uses of radioactive Isotopes.

Isotopes :-

Isotopes are defined as the atoms of an element that have same atomic number but different

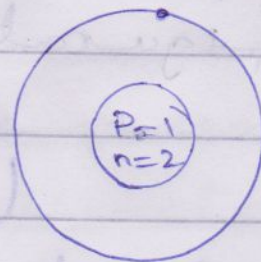
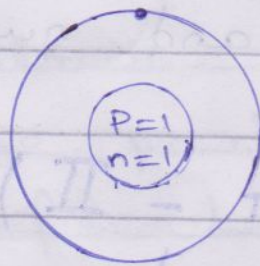
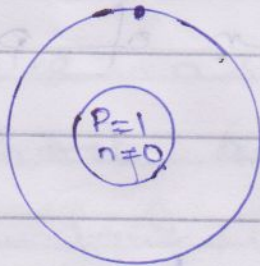
mass number.

They have same electronic configuration and number of protons but they differ in the number of neutrons. Isotopes have same chemical properties and have different physical properties.

Examples:-

1- Isotopes of Hydrogen :-

Three isotopes of hydrogen are named as protium (${}^1_1\text{H}$), deuterium (${}^2_1\text{H}$ or D) and tritium (${}^3_1\text{H}$ or T). Each one of them has 1 proton and 1 electron, but no. of neutrons are different.



Protium (${}^1_1\text{H}$) Deuterium (${}^2_1\text{H}$) Tritium (${}^3_1\text{H}$)

2- Isotopes of Chlorine :-

There are two isotopes of chlorine, ${}^{35}_{17}\text{Cl}$ and ${}^{37}_{17}\text{Cl}$.

Uses of Isotopes :-

Following are uses of isotopes.

- 1- For the treatment of skin cancer, isotopes like P-32 and Sr-90 are used because they emit less

penetrating beta radiations.

2. The radioisotopes are used in a chemical reaction to follow a radioactive element during the reaction and ultimately to determine the structure.

Question: 5(b)

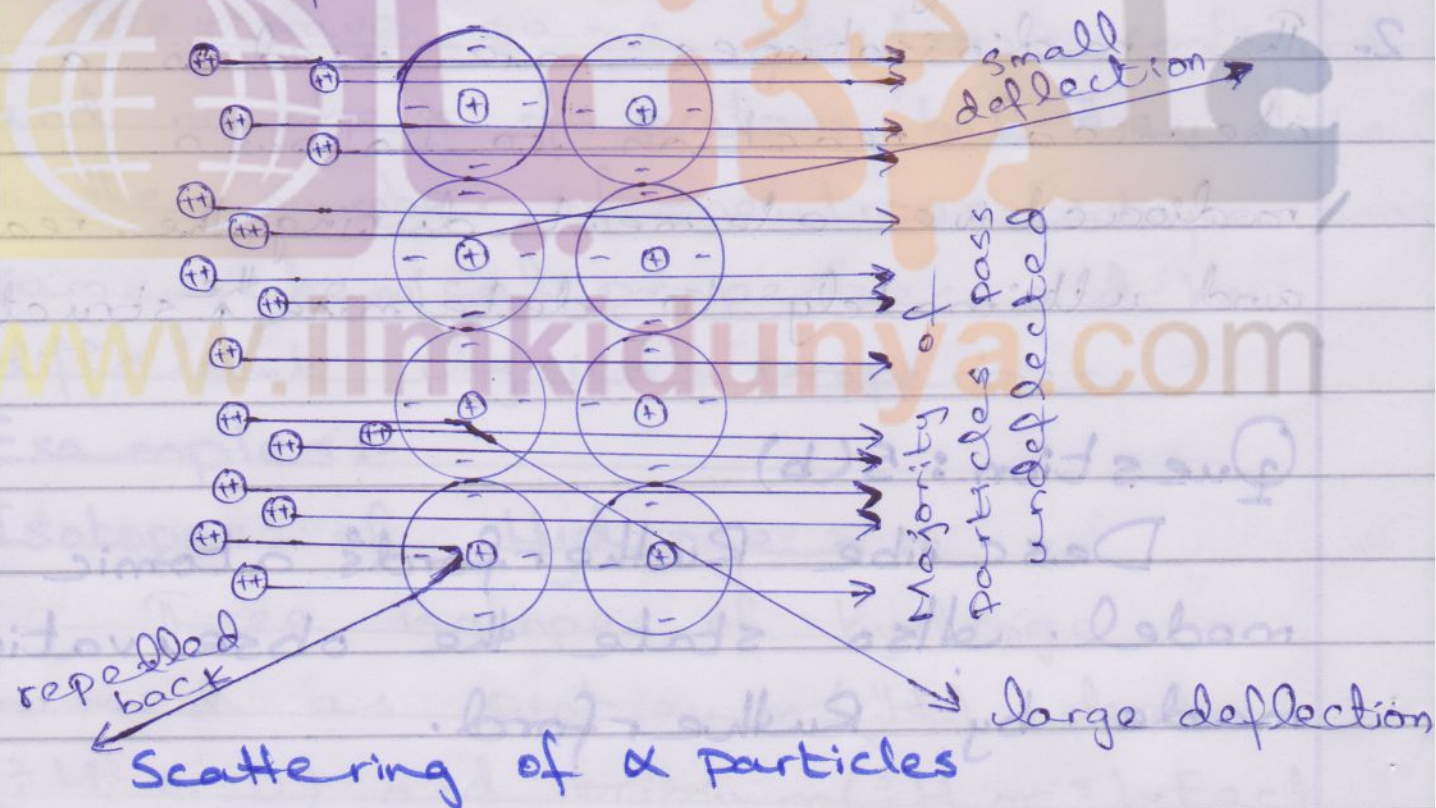
Describe Rutherford's atomic model. Also state the observation made by Rutherford.

Rutherford's Atomic Model:-

Rutherford performed "Gold Foil" experiment to understand how negative and positive charges could coexist in an atom. He bombarded alpha particles on a 0.00004cm thick gold foil. Alpha particles are emitted by radioactive elements like radium and polonium. These are actually helium nuclei (He^{2+}). They can penetrate through matter to some extent.

He observed the effects of α -particles on a photographic plate or a screen coated with zinc sulphide. He proved that the "plum pudding"

model of the atom was not correct.



Observations:-

Observations made by Rutherford were as follows

1. Almost all the particles passed through the foil undeflected.
2. Out of 20000 particles, only a few deflected at fairly large angles and very few bounced back on hitting the gold foil.

Question : 6(a)

Write the properties of canal rays.

Properties of Canal Rays:-

The properties of these

rays were as following:

- 1- These rays travel in straight lines in a direction opposite to the cathode rays.
- 2- The deflection in electric and magnetic field proved that these are positively charged.
- 3- The nature of canal rays depends upon the nature of gas, present in the discharge tube.
- 4- These rays do not originate from the anode. In fact these rays are produced when the cathode rays or electrons collide with the residual gas molecules present in the discharge tube and ionize them as follows:



- 5- Mass of these particles was found equal to that of a proton or simple multiple of it. The mass of a proton is 1840 times more than that of an electron.

Question : 6(b)

Write a note on shell and

sub shell.

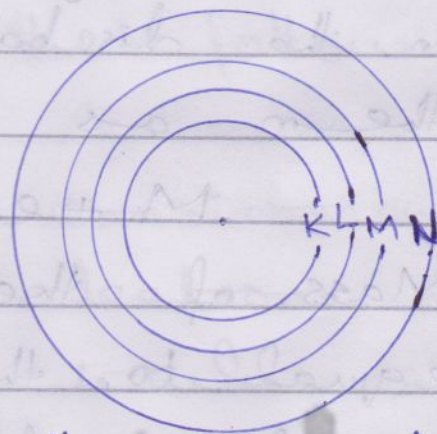
Shell :-

Shells are the main energy levels that electrons can occupy. Shells are represented by circles around the nucleus. They are counted from the center to outward. The number of electrons that a shell can accommodate is given by $2n^2$, where n is the shell number.

Energy levels are represented by n values 1, 2, 3 and so on. They are designated by the alphabets K, L, M and so on. A shell closer to the nucleus is of minimum energy.

Since K shell is closest to the nucleus, the energy of shells

increases from K shell onwards.



Subshell :-

A shell also consists of subshells. The number of subshells in a shell is equal to its n value. Each subshell is designated by a small

alphabetical letters s, p, d, f etc.

n value	Shell	Subshell
1	K	only s
2	L	s, p
3	M	s, p, d
4	N	s, p, d, f

Question: 7(a)

Write five characteristics of cathode rays.

Characteristics of Cathode Rays:-

The characteristics of cathode rays were determined, which are given below:

- 1- These rays travel in straight lines perpendicular to the cathode surface.
- 2- They can cast a sharp shadow of an opaque object if placed in their path.
- 3- They can be deflected towards positive plate in an electric field showing that they are negatively charged.

4. Light is produced when these rays hit the walls of the discharge tube.

5. It was found that the same type of rays were emitted no matter which gas and which cathode was used in the discharge tube.

Question : 7(b)

State the postulates of Bohr's atomic model.

Bohr's Atomic Model Postulates:-

The Bohr's atomic model was based upon the following postulates:

1. The hydrogen atom consists of a tiny nucleus and electrons are revolving in one of circular orbits of radius r around the nucleus.
2. Each orbit has a fixed energy that is quantized.
3. As long as electron remains in a particular orbit, it does not radiate or absorb energy. The

energy is emitted or absorbed only when an electron jumps from one orbit to another.

- 4- When an electron jumps from lower orbit to higher orbit, it absorbs energy and when it jumps from higher orbit to lower orbit it radiates energy. This change in energy, ΔE is given by following Planck's equation

$$\Delta E = E_2 - E_1 = h\nu$$

Where h is Planck's constant equal to 6.63×10^{-34} Js, and ν is frequency of light.

- 5- Electron can revolve only in orbits of a fixed angular momentum mvr , given as:

$$mvr = n \frac{h}{2\pi}$$

where ' n ' is the quantum number or orbit number having values 1, 2, 3 and so on.