MEHRAN

STANDARD

SCIENCE

FOR

CLASS – 7

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Preface

The series STANDRAD SCIENCE is a set of books according to the new syllabus of the 6th 7th And 8th class students. These science books are in particular written for young children to build up awareness about basic science in their social background.

In these book we give most activities and exercise for students to increase their knowledge about science easily.

It is important that your children start learning early. The aim is to spark the interest of the students in the science and prevent them from disliking and rejecting the science and possibly scientific professional as the result of negative experience at school and at home.

It is especially for those students who later work in field related to the sciences to have a foundation for understanding their world that allows them to make informed decisions.

This will expand their horizon and they will be interest and about thing they read, hear, or see in this 21st century and ahead.

The text is written is simple and easy language for help of students short and long questions also giving in these books. All these things will make learning cool for children.

DISTRIBUTION OF SYLLABUS

There are twelve (12) chapter in standard science book for class VII. These chapters are useful for class VII students.

According to syllabus, this standard science book id divided into three terms consists of four chapter. The further details of syllabus is given as follows.

DISTRIBUTION OF SYLLABUS FOR FRIST TERM

The first term consists of four chapters. These chapter are useful for VII class students. These chapters are as under.

CHAPTER' #	CHAPTRER'S NAME
CHAPTER- 1	Science and Scientific world
CHAPTER- 2	Study of life (Biology)
CHAPTER- 3	Organization of life
CHAPTER- 4	Classification of living organism

DISTRIBUTION OF SYLLABUS FOR SECOND TERM

The second term consists of four chapters. These chapter are useful for VII class students. These chapters are as under.

CHAPTER #	CHAPTRER'S NAME
CHAPTER- 5	Viruses, Bacteria, Cyanobacteria
CHAPTER- 6	Study of Matter (Chemistry)
CHAPTER- 7	Chemical combination
CHAPTER- 8	Structure of Atom

DISTRIBUTION OF SYLLABUS FOR FINAL TERM

Final term consists of four chapters. These chapters are useful for VII class students. These chapters are as under:

CHAPTER #	CHAPTRER'S NAME
CHAPTER- 9	Periodicity of elements
CHAPTER- 10	Study of matter and energy
CHAPTER- 11	Measurement
CHAPTER- 12	Force and Friction

Chapter 1

SCIENCE AND SCIENTIFIC WORLD

Exercise

1. CHOOSE THE CORRECT ANSWER:

1. The word science is derived from a _____ word Scientia.
   a. French b. Greek c. Latin
Ans:
2. Scientia means _____.
   a. To hide b.to tell c. to known
Ans:
3. The study of life is called _____.
   a. biology b. chemistry c. physics
Ans: Biology
4. _____ is the branch of science that deals with the study composition structure and properties of matter.
   a. Biology b. chemistry c. physics
Ans: Chemistry
5. The word physics is come from _____ word Physikos.
   a. Greek b. Latin c. French
Ans: Greek
6. _____ is the branch of science that deals with the study of matter, energy and relationship between them.
   a. Physics b. Psychology c. Astrology
Ans: Physics

7. _____ is the basic tool for elaborating the phenomenon.
   a. Observation b. Hypothesis c. Theory
Ans: Observation
8. A _____ is an intelligent scientific guess.
   a. Observation b. Hypothesis c. Theory
Ans: Hypothesis
9. Scientific information is sometimes called _____.
   a. Data b. Prediction c. Chart
Ans: Data
10. A _____ shows the result of an experiment.
   a. Line graph b. Bar chart c. Pie chart
Ans: Line graph

SHORT ANSWER QUESTIONS

Q.1: what is science?

Ans: Science:

The word science is derived from a Latin word "Scientia" meaning to know. Science is a way of knowing. Science is the study of nature. Science emerges from our curiosity about ourselves, the world and the universe.

Q.2: What is biology?

Ans: Biology:

The word biology is come from two Greek words.

Bio= life

Logos= thinking reasoning or study.

Biology is the branch of natural science that deals with organism and different phenomenon of life.

Q.3: What is chemistry?

Ans: Chemistry:

Chemistry is derived from the word Kheem which is the old name of Egypt and probably given to it due to black colour of the Egyptian soil. Chemistry is the branch of science that deals with the study of composition, deposition, structure and properties of matter.

Q.4: What is physics?

Ans: Physics:

The word physics is come a Greek word "physios" meaning natural.

Physics is the branch of science which deals with the study of matter and energy and also relationship between them.

Q:5: What is difference between hypothesis and theory?

Ans: Hypothesis:

A hypothesis is an intelligent scientific guess.

Theory:

A theory is the verified result of hypothesis.

Q:6: What is Scientific law?

Ans: Scientific Law:

A theory which is tested again and again and found to fit the fact and from which valid prediction may be made is known as scientific law.

Q.7: What is Bar Graph?

Ans: Bar Graph:

A graph shows the result of an experiment as a picture. You can see a glance what the result show.

This bar graph shows the range of hand-span sizes found in a group of people.

LONG ANSWER QUESTIONS.

Q.1: What is significance of science? Describe the fields of science.

Ans: Significance of Science:

It helps us to understand the natural world.

It is concerned with information gained by observing and testing the natural world.

Science provides a systematic and logical way to understand the universe and the phenomenon within it, building new ideas that illuminate our world.

Science offers tools and knowledge to solve practical problems and to present appropriate answers to serious issues.

Fields of science:

The main fields of science are Biology, Chemistry and Physics.

Biology:

The word Biology is come from two Greek words.

Bios = life

Logos = Thinking, reasoning or study.

Biology is the branch of natural science that deals with the organism and different phenomenon of life.

Chemistry:

Chemistry is derived from the word, "Kheem" which was the old name of Egypt and probably given to it due the black colour of the Egyptian soil.

Chemistry is the branch of science that deals with the study of composition, structure and properties of matter.

Physics:

The word physics is come from a Greek word " Physikos" meaning natural.

Physics is the branch of natural science which deals with the study of matter, energy and relationship between them.

Q.2: Describe the teachings of Islam for acquiring knowledge.

Ans: Teachings of Islam for acquiring knowledge:

In an authentic hadith Saheeh Bukhari Sharif, the mode of the first revelation is narrated when the Holy Prophet Hazrat Muhammad (S.A.W) was in the cave of Hira.

Read: In the name of the Lord who creath.
Creath man from a clot.
Read: And it is thy Lord the most bountiful.
Who teachetch by pen, Teachetch man that,
Which he knew not.
(Sura: Al-Alaq, Ayat 1-5)

It is obvious from the first revelation that the reading in Islam is the most important feature of life. In the Holy Quran the knowledge of names of things is related to the very first man, Adam (may Allah place

his soul in peace and tranquility. Superiority of Adam to angles is due knowledge of things.

And he taught Adam all the names, then showed them to angles, saying:

"Inform me the names of theses and was if you are truthful."

These verses tell us the first man Adam, created on the earth had knowledge of things and was not ignorant person. It means that our very first ancestors were blessed with knowledge of things by Allah itself.

Q.3: What is scientific method? Describe its step.

Ans: Scientific Method:

The way to perform experiments make observations and reduce the result in science is known as scientific method.

Steps of scientific method:

Scientific method is based on the following steps.

a. Observation b. Hypothesis
c. Experiment d. Theory
e. Prediction f. Scientific Law

0bservation:

The study of collection data about natural processes and scientific problems is known as observation. Observation is the basic tool for elaborating the phenomenon.

Hypothesis:

Hypothesis is the statement that may be a possible answer of the problem. A hypothesis is an intelligent scientific guess.

Experiment:

Experiment is an organized process, which is used to test the truth of the hypothesis.

Theory:

Theory is the verified result of hypothesis, which is obtained, with the help of careful experimentations.

Prediction:

Forecast made after careful analysis of a theory is known as prediction.

Scientific Law:

A theory which is tested again and again and found to fit the facts and from which valid prediction may be made is then known as scientific law or principle.

Chapter 2

STUDY OF LIFE (BIOLOGY)

(1) Choose the correct answer.

1. The study of plants is called _____.
   a. Botany b. Zoology c. Anatomy

Ans: Botany

2. The study of animals is called _____.
   a. Botany b. Zoology c. Anatomy

Ans: Zoology

3. This branch of biology deals with the study of external structural characteristics of plants and animals.
   a. Morphology b. Anatomy c. Histology

Ans: Morphology

4. The study of structure, function and composition of cell is called:
   a. Cytology b. Histology c. Physiology

Ans: Cytology

5. It deals with the chemistry and chemical aspects of the living system.
   a. Biometry b. Biophysics c. Biochemistry

Ans: Biochemistry

(2) SHORT ANSWER QUESTIONS

Q.1: What is Biology?

Ans: Biology:

The word Biology is composed of two Greek words.

Bios = Life

Logos = Thinking, reasoning or study.

Biology is the branch of natural science that deals with the study of living organisms and different phenomenon of life.

Branches of Biology:

Extensive research during the 20th century has led to the division of Biology into some of the important branches of Biology are given below.

i. Botany ii. Zoology
iii. Micro-biology iv. Morphology
v. Anatomy
vi. Histology or tissue Biology
vii. Cytology or cell Biology
viii. Physiology ix. Ecology
x. Genetics xi. Bio-chemistry
xii. Bio Physics xiii. Bio-metery.

Q.2: What is difference between Botany and Zoology?

Ans: The difference between Botany and Zoology is shown in the given columns.

Botany	Zoology
It is the branch of biology which deals with the scientific study of plants. It is also known as plant biology.	It is the branch of biology which deals with the scientific study of animals. It is also known as animal biology.

Q.3: What is difference between Anatomy and Morphology?

Ans: Ans: The difference between Anatomy and Morphology is shown in the given columns.

Anatomy	Morphology
It is the branch of Biology that deals with the internal structure of organs of an organism.	It is the branch of Biology that deals with the external structural characteristics of plants and animals.

Q.4: Define the importance of Biology.

Ans: Importance of Biology:

The importance of Biology is given below.

Biology has made an enormous impact on human welfare and involving quality of life.

It helps us to produce more food and enables man to realize the importance of balanced diet.

It is through the advancement in Biology that man has been able to controls diseases.

Biology researches in many areas including pest control and genetics have made possible the production has increased.

Q.5: Define Needham's experiment.

Ans: Needham's Experiment:

In 1748, an English Scientist and biologist, Needham boiled meat in water and then poured this gravy in bottles and closed their mouth with cork. After a few days' micro-organisms were produced in these covered bottles. This once excited the believers of Abiogenesis (concept i.e life form non- living).

(3) LONG ANSWER QUESTIONS.

Q.1: Describe the branches of Biology. Also describe the relationship of Biology with other branches of science.

Ans: Branches of Biology:

Extensive research during the 20th century has led to the division of Biology into a large number of specialized branches. Some of the important branches of Biology are given below:

1. Morphology:

It is the branch of Biology that deals with the external structural characteristics of plants and animals.

2. Anatomy:

It is the branch of Biology that deals with the internal structure of organs of an organism.

3. Cytology:

It is the branch of Biology that deals with the study of structure, function and composition of cell and cell organelles. It is also known as cell biology.

4. Histology:

It is the branch of Biology that deals with the study of tissues of plants and animals under a microscope. It is also known as tissue biology.

5. Physiology:

It is the branch of Biology that deals with the study of function of different parts of plant and animals.

6. Ecology:

It is the branch of Biology that deals with the study of relationship of living organisms with each other and with their environment. It is also known as environmental biology.

7. Genetics:

It is the branch of Biology that deals with the study of inheritance including transmission of hereditary characteristics and traits from parents to their offspring.

Relationship of Biology with other sciences:

Biology is a multi-dimensional science. It is linked with the knowledge of chemistry, Physics, Mathematics, sociology, statistics etc, and these branches which are related to biology are bio-chemistry, bio-physics, biometry etc. Some of them are discussed below.

Bio-chemistry:

The branch of chemistry which require firm knowledge of biology and chemistry to explain the system of bio-molecules, their requirement and the effect caused by the deficiency and efficiency of different molecules on the organisms and their metabolism.

Bio-Physics:

The branch of Biology where we apply laws and techniques of Physics to explain the functions of living organisms etc, to find out the age of fossils etc. Use of sound waves for ultra sound and laser technology show some relationship with Biology.

Biometry:

It is the branch of mathematics where data and measurements related to living organism are dealt with.

Q.2: Describe the concept of Biogenesis and Abiogenesis. Prove the

Concept of Biogenesis with the help of Redi's experiment.

Ans: Biogenesis:

The view that living things can develop only form other living things is known as biogenesis.

Abiogenesis:

Aristotle believed that fishes, frogs are aquatic insects spontaneously develop from the non-living thing is known as Abiogenesis.

Redi's Experiments to prove the concept of Biogenesis:

The following are a few of the experiments which Redi performed and led to the concept of Biogenesis.

Experiment: No.1

Some dead snakes were placed in a box. It was noticed that flies gathered around the dead snakes. After three days, maggots appeared in the bodies. After about eighteen days these maggots transformed into pupae. Some of these pupae were then transferred to separate glass containers covered with a sheet of paper. After eight days, a fly emerged from each pupa and all flies were similar those which visited the body of the dead snakes. From this it was concluded that maggots were the offspring of flies. The flies had laid

eggs on the dead snakes. These eggs gave rise to maggots which formed from them.

Experiment: No. 2

In another experiment Redi took eight bottles. He put dead snakes in two pieces of meat in other bottles and dead flies in other bottles. He kept four bottles open and four covered. After a few days, maggots appeared in the bottles kept covered. This showed that the flies were prevented from entering the bottles, the maggots did not appear.

Some workers, however, criticized his experiment and said that the maggots failed to appear in the covered bottles because air being so essential for abiogenesis could not enter these bottles. To test this, Redi performed another experiment.

Experiment: No. 3

Some pieces of meat were put in a bottles whose mouth was covered with gauze. Thus air, could enter the bottles while flies remained out. Again no maggots appeared in the piece of the fact that entry of air was possible. These experiments provided evidence supporting the idea that only living things give to living things.

Chapter 3

ORGANIZATION OF LIFE

Exercise:

(1) CHOOSE THE CORRECT ANSWER.

1. In _____, Galileo, an Italian astronomer and physicist developed microscope.
   a. 1610 b. 1620 c. 1630

Ans: 1610

2. In _____, Robert Hook made an improved microscope by Combining lenses.
   a. 1665 b. 1675 c. 1685

Ans: 1665

3. _____ is the basic structural and functional unit of life.
   a. Cell b. Tissue c. Organ

Ans: Cell

4. In 1831, _____ discovered the nucleus.
   a. Robert Hook b. Robert Brown
   c. Rudolf Virchow

Ans: Robert Brown

5. In 1838, a German botanist _____ proposed that all plants are made Up of cells.
   a. Schlieden b. Schwann
   c. Rudolf Virchow

Ans: Schlieden

6. New _____ are formed by the division of pre-existing cells.
   a. Atom b. Cells c. Tissue

Ans: Cells

7. The most important and visible part of a cell is _____.
   a. Nucleus b. Ribosomes c. Mitochondria

Ans: Nucleus

8. It provides energy to cell and known as the power house of the cell.
   a. Nucleus b. Ribosomes c. Mitochondria

Ans: Mitochondria

9. The organisms made of eukaryotic cell are called _____ e.g. Animals, plants, Fungi and Protists.
   a. Prokaryotes b. Eukaryotes
   c. None of these

Ans: Eukaryotes

10. These are involved in the synthesis of protein.
    a. Ribosomes b. Centriole c. Vacuole

Ans: Ribosomes

11. _____ is fluid filled structure bounded by a single membrane.
    a. Ribosome b. Centriole c. Vacuole

Ans: Vacuole

(2) SHORT ANSWER QUESTIONS.

Q.1: Define cell.

Ans: Cell:

Cell is the basic structural and functional unit of living organisms. Cell was discovered by Robert Hook in 1665. The word cell is derived from the Latin word cellulae which means chambers.

Q.2: Give the main points of cell theory.

Ans: Cell Theory:

The main points of cell theory are as under:

i. All living organisms are composed of one or more cells.
ii. The cell is the smallest, basic structural and functional unit of all organisms.
iii. New cells are formed by the divisions of pre-existing cells.

Q.3: What is cell membrane?

Ans: Cell membrane:

Cell membrane is the outer most membrane of an animal cell while in plant cell, it lies next to the cell wall. It is made up of lipids and proteins. The membrane is electively permeable. It controls the movement of materials passing through it.

Q.4: What is nucleus?

Ans: Nucleus:

Nucleus is the most important part of the cell. Its envelop is known as the nuclear membrane, which is double membrane and porous. In the nucleus there is a granular matrix called nucleoplasm, in which one or two nucleoli and chromosomes are present. Nucleus controls all the functions of the cell.

Q.5: What is mitochondria?

Ans: Mitochondria:

Mitochondria are important organelles of a eukaryotic cell, because they provide energy to the cell and are thus known as the power house of the cell. They are oval or rod like structure bounded by the

double membrane. Outer membrane is smooth while inner membrane is infolding in the inner chamber. These infoldings are known as cristae.

Q.6: Define vacuole.

Ans: Vacuole:

Vacuole is a fluid filled structure bounded by a single membrane. Animal cells contain relatively small vacuoles, which are usually more than one in number. However, in the plant cell there is a large central big vacuole filled with water and salts. In small organism water and waste materials are exerted through special vacuoles known as contractile vacuoles and food is digested in food vacuoles.

Q.7: Distinguish between animal cell and plant cell.

Ans: The distinguish between animal and plant cell is shown in the given columns.

Animals cells	plants cells
1. cell wall is absent in animals' cell.	1. cell wall is present in plants cell.
2. cell membrane is the outer most structure of animal's cell.	2. Plant cell-membrane lies inside the cell wall
3. Nucleus generally lies in the centre of the animals cell.	3. Nucleus often lies near the side of the call wall of the plant cell .
4. Many small vacuoles are present in the cytoplasm of animals cell.	4. A large vacuole is filled with water liquid present in the centre of the plant

	cell.
5. Chloroplast is absent in animal cell.	5. Chloroplast is present in plant cell.

Q.8: Define Golgi bodies.

Ans: Golgi bodies:

Golgi bodies have been named after a scientist called "Golgi" who first discovered them. This consists of a set of smooth, flattened membranous sacs called cristea that are stacked over each other. Their function is to store the secretions, convert them into finished products and pack them at their margins into small rounded sacs called Golgi vesicles, which transport secretions outside the cell.

(3) LONG ANSWER QUESTIONS.

Q.1: Describe cell theory. Write its salient features.

Ans: Cell Theory:

In 1838, a German botanist Schleiden, proposed that all plants are made up of cells. Next year another German zoologist, Theodor Schwann stated that all animals are made up of cells. In 1858, Rudolf Virchow stated that new cells come only from other cells. i.e. animal cells come from animal cells and plant cells come from plant cells. The combined efforts of Schleiden, Schwann and Rudolf Virchow finally gave rise to cell theory.

Salient Feature of cell Theory:

The salient features of cell theory are under.

1. All living organisms are composed of one or more cells.
2. The cell is the smallest, basic structural and functional unit of all organisms.
3. New cells are formed by the division of pre-existing cells.

Q.2: What is difference between Prokaryotic cells and Eukaryotic cell?

Ans: The difference between Prokaryotic cells and Eukaryotic cell is under as following.

Prokaryotic cell	Eukaryotic cell
1. The organisms made of prokaryotic cell are called prokaryotes e.g. Bacteria and Cyanobacteria.	1. The organisms made of eukaryotic cells are called eukaryotes e.g. animals, plants, Fungi and protists.
2. Chromosomes are present in the cytoplasm and no membrane bounded nucleus is present.	2. Chromosomes are present in membrane bounded nucleus.
3. No membrane bounded cell organelles are present.	3. Membrane bounded organelles are present.
4. Ribosomes are of small size and freely scattered in cytoplasm.	4. Ribosomes are of large size and are present on endoplasmic reticulum or free in cytoplasm.

5. Cell wall is composed of peptidoglycan or murrain. Cellulose is absent.	5. Cell wall of plant cell is composed of cellulose while in Fungi it is made of chitin.
6. Their cells are simple, comparatively smaller in size (average diameter 0.5nm to 10nm).	6. These cells are complex comparatively larger in size (average diameter 10nm to 100nm).

Q.3: What is Endoplasmic reticulum? Define it types.

Ans: Endoplasmic Reticulum:

It is the network of channels throughout the cytoplasm from nuclear membrane to the plasma membrane. It plays an important role in the transport of materials from one part of the cell to the other.

Types of Endoplasmic Reticulum:

There are two types of endoplasmic reticulum. Such as:

1. Smooth endoplasmic reticulum.
2. Rough endoplasmic reticulum.

1. Smooth endoplasmic reticulum:

It is non granular because ribosomes are not attached on it. These play an important role in lipids formation.

2. Rough endoplasmic reticulum:

It is granular because ribosomes in the form of small granules are attached on it, which are involved in protein formation.

Chapter 4

CLASSIFICATION OF LIVING ORGANISMS

Exercise:

(1) CHOOSE THE CORRECT ANSWER.

1. The division of living things into different groups is called _____.
   a. Organization b. Classification
   c. Taxonomy

Ans: Classification

2. The basic unit of classification is _____.
   a. Species b. Genus c. Family

Ans: Species

3. _____ adopted the binomial nomenclature system for naming Organization.
   a. C. Linnaeus b. H. Whittaker
   c. Margulis

Ans: C. Linnaeus

4. The family of Mustard is _____.
   a. Brassicasea b. Poaecceae
   c. Rosacceae

Ans: Brassicasea

5. Closely related species are grouped together into _____.
   a. Family b. Genus c. Order

Ans: Genus

6. Multicellular organisms having no cell wall and no chlorophyll are:
   a. animals b. plants c. bacteria

Ans: animals

7. The family of man is _____.
   a. Palmaceae b. Ranidae c. Hominidae

Ans: Hominidae

8. Scientific name of Mustard is _____.
   a. Brassica Tubersom b. Brassica Campetris
   c. Brassica Annelida

Ans: Brassica Campetris

9. Scientific name for Frog is _____.
   a. Rana Tanha b. Ranatigrica
   c. Rana Tigrina

Ans: Rana Tigrina

10. Scientific name for Human is _____.
   a. Homodreams b. Homosapiens
   c. Homppatheins

Ans: Homosapiens

11. These are animals with an elongated soft body and no backbone.
   a. Worms b. Reptiles c. Birds

Ans: Worms

12. They have thick, dry and rough skin.
   a. Worms b. Reptiles c. Amphibians

Ans: Reptiles

13. Indus Dolphin is a _____ and found only in the Indus.
   a. Worms b. Reptiles c. Mammals

Ans: Mammals

(2) SHORT ANSWER QUESTIONS

Q.1: Define classification.

Ans: Classification:

The division of living things into different groups is known as classification.

Q.2: Define taxonomy.

Ans: Taxonomy:

The scientific study which deals with the classification of living organism is known as taxonomy.

Q.3: Define species.

Ans: Species:

The basic unit of biological classification is the species. A species is a group of organism which has numerous physical features in common and which ae normally capable of inter breeding and producing fertile off-spring.

Q.4: What is binomial nomenclature?

Ans: Binomial nomenclature:

C-Linnaeus adopted the binomial nomenclature system for naming organism to eliminate confusion while using native or common names when describing an organism. He gave each species a scientific name comprising two words. This is known as binomial nomenclature.

Q.5: Write the classification of Mustard.

Ans: Classification of Mustard.

Common Name	Mustard
Kingdom	Plantae

Division	Trichophyte
Class	Dicotyledonous
Order	Capparales
Family	Brassicasea
Genus	Brassica
Species	Campetris
Scientific Name	Brassica Campetris

Q.6: Name the five kingdom, suggested by Robert H. Whittaker.

Ans: In 1969, Robert H. Whittaker suggested a new system of classifying living organisms such as:

S. No.	Kingdoms' Name
1.	Kingdom Monera
2.	Kingdom Protista
3.	Kingdom Fungi
4.	Kingdom Plantae
5.	Kingdom Animalia

Q.7: What is difference between vertebrate and Invertebrate?

Ans: The difference between vertebrate and invertebrate is shown in the given column.

Vertebrate	Invertebrate
The group of animals with back-bone is known as vertebrate. For example; goat, cat, fish etc.	The group of animals without back-bone is known as invertebrate. For example; housefly, ant, butterfly etc.

Q.8: Write short note on reptiles.

Ans: Reptiles:

Most of the reptiles live on land but some are found in water. They have thick, dry and rough skin. They also have scales on their whole body. The reptiles of today belong to the family of dinosaur which are extinct now. They have claws in their fingers and sharp teeth in their jaws to catch a pray.

Q.9: What are amphibians?

Ans: Amphibians:

Amphibians spend a part of their life on land and a part in water. Therefore, they are known as amphibians which means 'living a dual life". Usually they have four legs. They respire with the help of gills in larval stage and by lungs and skin while adult. They have smooth and moist skin. They hibernate in water.

(3) LONG ANSWER QUESTIONS:

Q.1: Write a detailed on five kingdoms, suggested by Robert H. Whittaker.

Ans: Kingdom system suggested by Robert H. Whittaker:

Previously living things were classified into two kingdoms namely plant kingdom and animal kingdom. The basis of this division was presence or absence of cell-wall and chlorophyll. But a large number of living organisms did not fit clearly into the category of plants and animals. To solve this problem, Robert H.

Whittaker (1969), suggested a new system classifying living organism, such as:

1. Kingdom Monera:

These are prokaryotic feed by a variety of different methods.

2. Kingdom Protista:

These are unicellular eukaryotes which feed by a variety of methods.

3. Kingdom Fungi:

These are multicellular eukaryotes which feed heterotrophically by absorption.

4. Kingdom Plantae:

These are multicellular eukaryotes which feed photosyntetically

5. Kingdom Animalia:

These are multicellular eukaryotes feed heterotrophically by ingestion.

Q.2: Write a detailed note on five kingdoms, suggested by Margulis and Schwartz:

Ans: Kingdom system suggested by Margulis and Schwartz:

In 1989, Margulis and Schwartz modified the Whittaker scheme and put forward new kingdom system. According to this system, there are five kingdoms of living organism as listed below.

1. Kingdom Prokaryotes:

It includes all the prokaryotes e.g. Bacteria and cyanobacteria.

2. kingdom Protoctitsa:

It includes all the eukaryotes organisms which are no longer classified as animals, plants or fungi e.g. Euglena, Paramecium, Chlamydomonas, Yeast etc.

3. Kingdom Fungi:

It includes non-cholorophylous, multicellular, eukaryotic organisms having cell-wall e.g. Agaricus (Mushroom) etc.

4. Kingdom Plantae:

It includes the cholorophylous multicellular eukaryotic living organisms, having cell-wall and the embryonic development e.g. Apples, Sunflower etc.

5. Kingdom Animalia:

It includes all the non-cholorophylous multicellular eukaryotic organisms, having on cell wall, e.g. Hydra, earth worm, man etc.

Q.3: Define the following terms.

1. Worms:

These are animals with elongated soft body and no back bone. There are three types of worms. Flat worms have flat body e.g. Tapeworm. Round worms have round body e.g. Hook worms and segmented worms have segmented body e.g Earthworms.

2. Extinct Species:

We all know, many creatures live on our earth. they all have to struggle hard to save their lives. For their survival, it is necessary that they have a lot of food and are able to response (the ability of animals to produce their young ones). If all animals of the same

kind, they would die and become extinct. An extinct species is one which has not a single member living on our earth.

3.Indus Dolphin:

Indus Dolphin is a mammal and found only in the Indus. It is almost blind and can differentiate between light and dark. The Indus Dolphin has a long beak which helps it to catch fish. Now only 1100 dolphins are left. The main causes of their reduction are pollution of water and construction of dams and canals etc.

Chapter 5

VIRUSES, BACTERIA AND CYANOBACTERIA

Exercise:

1. CHOOSE THE CORRECT ANSWER:

1. The minute living organisms which can see without the help of microscope are called _____ organisms.
   a. Micro-organisms b. multicellular c. Not

Ans: Micro Organisms

2. _____ (Latin word Viron = poison) are the smallest, the simplest and perhaps the most primitive living things.
   a. Bacteria b. cyanobacteria's c. viruses

Ans: Viruses

3. By _____ many biologists had demonstrated that many diseases of man and others organisms were caused by bacteria.
   a. 1600 b. 1700 c. 1800

Ans: 1800

4. virus, discovered by _____ in 1892.
   a. louis pasture b. Iwanowsky
   c. Leeuwenhoek

Ans: Iwanowsky

5. _____ are non-cellular obligate parasites that always have a protean coat and nucleic acid core.
   a. Virus b. cyanobacteria c. Bacteria

Ans: Virus

6. Poliomyelitis is caused by _____ virus.
   a. Human immune b. polio
   c. influenza

Ans: Polio

7. _____ are viral infections of the upper respiratory tract.
   a. cold b. cough c. sneeze

Ans: Cold

8. Bacteria first observed by _____.
   a. Leeuwenhoek b. Iwanowsky c. Robert Hook

Ans: Leeuwenhoek

9. These bacteria are spherical in shape.
   a. Cocci b. bacilli c. spirilla

Ans: Cocci

10. These bacteria are rod in shape.
   a. Cocci b. bacilli c. spirilla

Ans: Bacilli

11. Bacterial cell range in size from 0.2 mm in width and _____ in length.
   a. 2mm to 20mm b. 3mm to 15mm
   c. 4mm to 20mm

Ans: 2mm to 20MM

12. They are found associated with living organisms.
   a. symbiotic bacteria b. parasitic bacteria
   c. Autotropic bacteria

Ans: symbiotic bacteria

13. Typhoid, cholera and Tuberculosis, are _____ diseases.
   a. Bacterial b. viral c. All of these

Ans: Bacterial

(2) SHORT ANSWER QUESTIONS.

Q.1: What are micro-organisms?

Ans: Micro-organism:

The minute living organisms which can be seen with the help of microscope are known as micro-organisms. They form a heterogeneous group which includes viruses, bacteria, cyanobacteria, protozoa, unicellular and multicellular fungi.

Q.2: Is virus living thing or non-living thing?

Ans: Virus as living thing:

Viruses are considered as living organisms because of the following characteristics.

Protein coat:

Viruses have a core of RNA and DNA surrounded by a protein coat and thus they resemble the chromosomes of living organisms.

Reproduction:

They have ability to reproduce. They can replicate themselves and reproduction is another feature of viruses which prove that viruses are living organisms.

Mutation: Many kinds of viruses undergo mutation is also a characteristic of living organisms.

Genetic recombination:

Viruses also show genetic recombination characteristics.

Characteristics of viruses as Non-Living:

1. They have a non-cellular structure.
2. They can undergo crystallization.
3. They are completely inactive outside the cells.

Q.3: Name the types of viruses.

Ans: Types of Viruses:

There are three types of virus which are under ads following.

Animal Virus. Plant Virus Bacteriophage

Q:4: Name some viral diseases.

Ans: 1.ANIMAL DISEASES

Several types of the animals' viruses cause many important diseases. Poliomyelitis measles, flu and mumps are the common viral diseases.

2. PLANT DISEASES

One of the best known plant disuses is caused by tobacco mosaic virus. This virus effects the leaves of tobacco plants and light green and yellow patches appear on the leaves of diseased plants.

Q:5: What is the bacteria? Name some shape of bacteria.

Ans: BACTERIA

Bacteria grow in every habitat of earth under all possible environmental conditions. They are the largest number of creatures and are found everywhere. They can survive in freezing temperature and also in hot springs. Bacteria, first observed by Leeuwenhoek are considered as the smallest, oldest but the simplest living organism. Bacterial cell ranges in size from 0.2 micron to micron in width and 2 to 10 (microns) in length.

Cocci: Bacilli: Spirilla:

Vibrio or comma:

Q:6: Name some bacterial disease.

Ans: **Some bacterial diseases:**

Some of the diseases found in man due to Bacteria are Typhoid, Tetanus, Cholera, Diphtheria and Tuberculosis.

Q:7: Define parasitic bacteria.

Ans: Parasitic Bacteria:

They grow inside the tissues of other living organisms. They obtain the expense of host.

Q:8: Give three salient features of cyanobacteria.

Ans: Salient features of cyanobacteria are given below:

These blue green algae are prokaryotic.

They may occur alone or in the form of colony.

Cell wall is double layered.

Protoplasmic differentiated into an outer coloured region – chromoplasm and an inner coloured region – Centroplasm.

Found in fresh water, few are marine.

Total asexual reproduction takes place e.g. Nostoc and Anabaena.

Cyanobacteria are photo synthesizer that sometimes can also fix atmospheric nitrogen.

3: LONG ANSWER QUESTIONS:

Q:1: Describe in detail the discovery and characteristics of viruses.

Ans: Discovery of Virus:

Viruses (Latin word Viron meaning poison) are the smallest, the simplest and perhaps most primitive living things. By 1800's many biologists had demonstrated that many diseases of man and other organisms were caused by Bacteria. Some diseases puzzled them. One such disease was tobacco mosaic disease occurring in tobacco plant leaves. In 1892 the Russian biologist, Iwanowsky showed that this disease was due to something smaller than Bacteria. He named them as viruses.

Characteristics of Viruses:

Viruses are non-cellular obligate parasites that always have a protein coat and a nucleic acid core. They cannot live and reproduce of living cells since they lack the ability to do so by themselves. The range in size from 20nm to 250nm (One nm = 10^{-9} metre). They are sub microscopic. There is no sexual or asexual reproduction. They reproduce by replication. The simple viruses use the enzymes of the host cell for both their protein synthesis and gene replication.

Q:2: Describe the structure and types of viruses. List the common viral disease.

Ans: Structure of Viruses:

They appear like small rods, tadpoles or may be polyhedral or like little sphere. Viruses may consist of nucleic acid, capsids, envelopes and tail fibers. Their nucleic acid may consist of a single or several molecules of DNA or RNA. The protein coat that encloses the nucleic acid is known as capsid. It may be

of different shapes. Capsid is made of protein subunits known as capsomeres. The number of capsomeres is characteristics of a particular virus.

Common Viral Diseases:

Animal Diseases:

Several types of the animal viruses cause many important diseases. Poliomyelitis is caused by polio virus. Cold is the viral infection of the upper respiratory tract. More than 200 of viruses that cause cold. Measles and mumps are the common viral diseases of children. Flu is the most common disease caused the influenza virus. The majority of human viral diseases are spread through respiratory tract by air born droplets spread by sneezing and coughing of infectious people or by the contaminated water and food or by blood or other body fluids.

Plant Diseases:

One of the best known plant disuses is caused by tobacco mosaic virus. This virus effects the leaves of tobacco plants and light green and yellow patches appear on the leaves of diseased plants.

Q:3: Give the general characters, shapes of bacteria.

Ans: General Characters of Bacteria:

Bacteria grow in every habitat of each under all possible environmental conditions. They are the largest number of creatures and are found everywhere. They can survive in freezing temperature and also in hot springs. Bacteria, first observed by Leuwenhoek are considered as the smallest, oldest but the simplest

living organisms. Bacterial cell ranges in size from 0.2 micron to 2 microns in width and 2 to 10 microns in length. Bacterial cell consists of cell wall, plasma membrane, cytoplasm ad nuclear material. Cell wall is chemically complex and totally different from ordinary plant cell wall as cellulose is not present. It is thick and rigid and made up of amino acids, sugar and sometimes chitin. Next to the cell wall is a thin outer most layer of plasma membrane.

Shapes of Bacteria:

There are four shapes of Bacteria.

1. Cocci: (Singular – coccus = Greek Kokkos, Berry, Rounded etc.)

They are spherical and according to cell arrangement they are solitary (single), (Monococcus), in pair (Diplococci) in chain (Streptococci), in cluster (Staphylococci) etc. They are non-flagellated.

2. **Bacilli:** (Singular- Bacillus = Latin, Bakulus meaning rod)

They are rod shaped. They may be found in pairs (Diplobacillus) or in chain (Streptobacillus) etc. They may be flagellated.

3. Spirilla: (Singular- Spirillum = Greek, Sperira meaning coil)

They are spiral or cork screw shaped.

4. Vibrio or Comma:

They are slightly curved or comma (,) shaped e.g. vibrio cholera. They may be flagellated.

Q:4: Describe the nutrition and economies importance of bacteria.

Ans: Nutrition in Bacteria:

Most bacteria are heterotrophic with few autotrophic. Heterotrophic bacteria are those which cannot synthesis their organic compounds from simple inorganic substances. According to their mode of feeding, heterotrophic may be saprophytic, symbiotic or parasitic.

Parasitic Bacteria:

They get their food from dead organic matter. The soil is full of organic compounds in the form of humus. Bacteria living in the soil have large number of enzymes that break down the complex substances of humus to simpler compounds. These bacteria absorb and utilize these simple compounds as a source of energy.

Symbiotic Bacteria:

They are found associated with other living organisms. They obtain food from the host without harming it, e.g. Nitrogen fixing Bacteria in the roots of leguminous plants.

Parasitic Bacteria:

They grow inside the tissues of other living organisms. They obtain the expense of host.

Autotrophic Bacteria:

They can synthesize organic compounds from simple inorganic substances.

Economic Importance of Bacteria:

Agricultural Bacteria:

Bacteria decompose dead plants and animals' bodies and convert various organic compounds into simple forms such as Nitrates, sulphate, phosphate, etc. for utilization by plants again.

Alimentary Bacteria:

They help herbivores in the digestion of cellulose by producing an enzyme cellulose.

Industrial Bacteria:

They help in curing and ripening of tobacco leaves, fermentation of sugar into alcohol, ripening of cheese, softening, curdling of milk, conversion of hides into leather etc.

Medicinal Bacteria:

Valuable antibiotic drugs have been obtained from Bacteria, e.g. Thyrothycin, Subtilin. Riboflavin is a vitamin produced by Clostridium.

Chapter 6
CHEMISTRY (STUDY OF MATTER)

(1) CHOOSE THE CORRECT ANSWER.

1. Chemistry is derived from the word "Kheem" which is the old name of _____.
   a. Greek b. Rome c. Egypt

Ans: Egypt

2. _____ is the branch of science which deals with the Composition, structure and properties of matter.
   a. Chemistry b. Physics c. Biology

Ans: Chemistry

3. The development of chemistry can be divided into _____ periods.
   a. Two b. Three c. Four

Ans: Three

4. The _____ believed that four elements (fire, air, water and earth) Combined to form all things.
   a. Roman b. Greek c. Muslim

Ans: Greek

5. The Greek period was from _____ B.C. in the history of chemistry.
   a. 500 to 300 B.C b. 400 to 200 B.C
   c. 300 to 100 B.C

Ans:

6. The Muslim period was from _____ A.D in the history of chemistry.
   a. 500 to 1500 A.D b. 600 to 1600 A.D
   c. 700 to 1700 A.D

Ans:

7. He was known as the father of chemistry.
   a. Jabir Ibne Hayan b. Al Razi
   c. Al Beruni

Ans: Jabir Ibne Hayan

8. He prepared alcohol by fermentation.
   a. Ibn-e-Sina b. Al Razi c. Al Beruni

Ans: Al Razi

9. _____ describes affectionately as the father of modern chemistry.
   a. Robert Boyle b. J Black c. J Priestly

Ans: Robert Boyle

10. Oxygen was discovered by _____.
   a. J Black b. J Priestly c. Lavoisier

Ans: J Priestly

(2) SHORT ANSWER QUESTIONS.

Q:1: What is chemistry

Ans: Chemistry:

The word chemistry is derived from "Kheem" which is the old name of Egypt and probably given to it due the black colour of the Egyptian soil. The art Khemia flourished in the early Egyptian and Greek civilizations. The word Khemia then became Al-khemiya in Arabic and in English word, alchemy was later derived.

Chemistry is the branch of science, which deals with the composition, structure and properties of matter and the chemical changes involved in it.

Q:2: Define importance of chemistry.

Ans: Importance of Chemistry:

People of the industrialized nations have a higher standard of living than the human race has ever known. More nutritious food, better health, better life and much more of this is due to chemistry. Chemistry enables us to design all sorts of materials, drugs to fight diseases, pesticides to protect our health and fertilizers to grow our crops for abundant food, fuels for transportation, fibers to provide comfort and variety in clothes and a lot of.

Q:3: Name periods of chemistry.

Ans: Periods of chemistry:

The development of chemistry can be divided into following three periods.

The Greek period
The Muslim period
The Modern period

Q:4: Write a short note on Jabir Ibne hayan.

Ans: Jabir Ibne hayan:

He was born in 721 in Iraq. He is known as father of alchemy.

Work:

He invented experimental methods for the preparation of Nitric acid, hydrochloric acid and white lead.

He developed methods for the extraction of metals.

He developed the methods for the dyeing of clothes.

His major practical achievement was the discovery of minerals, varnish and other acids.

Books:

His books on chemistry, including kitab-ul-kimya, and kitab-ul-Sabeen were translated into Latin and various European languages.

Q:5: write a short note on Al-Razi.

Ans: Al-Razi:

Work:

He was the first who used opium as anesthesia.

He prepared alcohol by fermentation process.

He has also given full descriptions and design for about twenty instruments used in chemical reaction.

As a chemist, he was the first to produce Sulphuric acid together with some other acids.

Books:

His books Kitab-al-Asrar deals with the preparation of chemical materials and their utilization.

Q:6: Write a short note on Robert Boyle.

Ans: Robert Boyle:

Robert Boyle described affectionately as the father of modern chemistry, was the first to put forward the idea that chemistry should be regarded as a systematic investigation of nature with the sole aim

of promoting knowledge. As a result, out of discoveries were made during later years.

Q:7: Write a short note on J. Priestley.

Ans: J Priestly:

J priestly discovered oxygen, Sulphur dioxide and hydrogen chloride. J Priestly is best known for his experiments with gases especially that which we now call oxygen.

Q:8: Name branches of chemistry.

Ans: Branches of Chemistry:

The main branches of chemistry are:

Physical chemistry
Organic chemistry
Inorganic chemistry
Analytical chemistry
Biochemistry
Industrial chemistry
Nuclear chemistry
Environmental chemistry
Polymeric chemistry

Q:9: What is difference between organic chemistry and inorganic chemistry?

Ans: The difference between organic and inorganic chemistry is given below.

Organic Chemistry	Inorganic Chemistry
It is the branch of chemistry that deals	It is the branch of chemistry that deals with the carbon

with the laws and the principles governing the combination of atoms and molecules in chemical reactions.	compounds with the exception of carbon dioxide and carbon monoxide, metal carbonates, bicarbonates and carbides. Actually it is the chemistry of hydrocarbons and their derivatives.

3. LONG ANSWER QUESTIONS:

Q:1: Write a detailed note on the contribution of Muslim Scientists in the field of chemistry.

Ans: Contribution of Muslim scientist in the field of chemistry:

During the first few centuries of Hijra, the Muslim scientists made remarkable contributions to the various branches of science, especially in the field of chemistry. Muslim scientists introduced scientific methods. They developed and used many laboratory equipments. They discovered various acids, alcohols and medicines. The modern scientific knowledge is based on the contribution of Muslims scholars and scientists.

Jabir Ibne hayan:

He was born in 721 in Iraq. He is known as father of alchemy.

Work:

He invented experimental methods for the preparation of Nitric acid, hydrochloric acid and white lead.

He developed methods for the extraction of metals.

He developed the methods for the dyeing of clothes.

His major practical achievement was the discovery of minerals, varnish and other acids.

Books:

His books on chemistry, including kitab-ul-kimya, and kitab-ul-Sabeen were translated into Latin and various European languages.

Al-Razi:

Work:

He was the first who used opium as anesthesia.

He prepared alcohol by fermentation process.

He has also given full descriptions and design for about twenty instruments used in chemical reaction.

As a chemist, he was the first to produce Sulphuric acid together with some other acids.

Books:

His books Kitab-al-Asrar deals with the preparation of chemical materials and their utilization.

Alberuni:

He contributed in chemistry, physics, Metaphysics, Mathematics, Geography and History.

Work:

He determined the densities of different metals.

He discussed chemical materials and their utilization.

Ibne-Sina:

He contributed in chemistry, Physics, medicine etc.

Q:2: Describe the role of other scientists in the development of chemistry.

Ans: The role of other scientist in the development of chemistry;

Robert Boyle:

Robert Boyle described affectionately as the father of modern chemistry, was the first to put forward the idea that chemistry should be regarded as a systematic investigation of nature with the sole aim of promoting knowledge. As a result, out of discoveries were made during later years.

J Priestly:

J priestly discovered oxygen, Sulphur dioxide and hydrogen chloride. J Priestly is best known for his experiments with gases especially that which we now call oxygen.

Q:3: Define the branches of chemistry.

Ans: Braches of Chemistry:

The main branches of chemistry are:

Physical Chemistry:

The branch of chemistry that deals with the laws of principles governing the combination of atoms and molecules in chemical reactions.

Organic Chemistry:

It is the branch of chemistry that deals with the laws and the principles governing the combination of atoms and molecules in chemical reactions.

Inorganic Chemistry:

It is the branch of chemistry that deals with the carbon compounds with the exception of carbon dioxide and carbon monoxide, metal carbonates, bicarbonates and carbides. Actually it is the chemistry of hydrocarbons and their derivatives.

Analytical Chemistry:

It is the branch of chemistry that deals with the chemistry of methods and techniques involved to determine the kind, quality and quantity of various components in a given substance.

Biochemistry:

It is the branch of chemistry that deals with the compounds of living organisms i.e. plants and animals and their metabolism in the living body.

Industrial chemistry:

It is the branch of chemistry that deals with the study of different chemical processes involved in the chemical industries for the production of synthetic products like glass, cement, paper, soda ash, fertilizers and medicines.

Nuclear Chemistry:

It is the branch of chemistry that deals with the study of changes occurring in the nuclei of atoms accompanied by the emission of invisible radiation.

Environmental Chemistry:

It is the branch of chemistry that deals with the study of interaction of chemical materials and their effects on the environment of animals and plants.

Polymeric Chemistry:

It is the branch of chemistry that deals with the study of polymerization and the products obtained through the process of polymerization such as plastics, synthetic fibers, papers etc.

CHAPTER 7
CHEMICAL COMBINATION

Exercise:

(1) Choose the correct answer.

1. Chemical changes are governed by some empirical laws known as Laws of _____.
   a. Biological combination
   b. Chemical combination
   c. Physical combination

Ans: Chemical combination

2. Mass is neither created nor destroyed during a chemical change, is the statement of _____.
   a. law of conservational of mass
   b. law of definite proportional
   c. law of reciprocal proportional

Ans: Law of conservation of mass

3. A given compound always contains exactly the same proportion of elements, by mass is the statement of _____.
   a. law of conservational of mass
   b. law of definite proportional
   c. law of reciprocal proportional

Ans: Law of multiple proportion

4. A change which alters composition of a substance in called_____.
   a. chemical reaction
   b. chemical property
   c. chemical Ratio

Ans: Chemical reaction

5. When motels react with or water then produce _____ gas.

a. Nitrogen b. oxygen c. Hydrogen

Ans: Hydrogen

SHORT QUESTION & ANSWERS

Q:1: What is meant by laws of chemical combinations?

Ans: Laws of Chemical Combinations:

Chemistry deals with the matter and the changes occurring in it, chemists are particularly interested in these changes, where one or more substances. They had found that these chemical changes are governed by some empirical laws known as laws chemical combinations.

Q:2: Name laws of chemicals combinations.

Ans: Name of Laws of chemical combinations:

Law of conservation of mass. Law of constant composition or law of definite proportion.

Law of multiple proportion.

Q:3: State law of conservation of mass.

Ans: Law of conservation of mass:

Introduction:

The French chemist Lavoisier, (1785) tried to learn about chemical changes by weighing the quantities of substances used in chemical reactions. He found that when a chemical reaction was carried out in a closed system, the total weight of the system was not changed.

Statement:

Its states that mass is neither created nor destroyed during a chemical reaction. In other words, in any chemical reaction the initial weight of the reacting substance is equal to the final weight of the product.

Q:4: State law of definite proportion.

Ans: Law of Definite proportion:

Introduction:

By the Eighteenth century, chemists showed that a given compound has a definite (constant) composition. French chemist in (1799) summarized this result in the form of law of definite proportion. It is also known as law of constant composition.

Statement:

It states that different sample of the same compound always contain the same elements combined together in the same proportion by mass.

Q:5: What is chemical reaction? Name types of chemical reactions.

Ans: Chemical Reaction:

Any change, which alters the composition of substances is known as chemical reactions. In this reaction or change one or more new substances are formed from the original substances. For example, when iron (Fe) rusts, it reacts with oxygen (O) of air in the presence of moisture to form red brown iron oxide (rust). Similarly, when coal is burnt, it forms smoke,

gaseous products and ashes. The burning of coal is a chemical change (reaction) in which it combines with oxygen in air to form entirely new substances.

Types of chemical reactions:

Chemical reactions can be divided commonly into five different types.

Decomposition reaction.
Addition reaction or combination reaction.
Single displacement reaction.
Double displacement reaction.
Combustion reaction.

Q:6: Define chemical equation. Define co-efficient.

Ans: Chemical Equation:

Chemical equation is the short hand method of describing (expressing) the chemical reaction in term of symbols and formulae of the substances involve in the chemical reaction.

Co-efficient;

The numbers in front of the formulae in a chemical equation are known as co-efficient. They show the number of molecules that react with each other.

Q:7: Define reactant and product?

Ans: Reactant:

The starting substance in the chemical reaction are called reactants. Reactants are always written on the left hand side in the chemical equation.

Product:

The substances which are formed by the reactants in the chemical reaction are known as products. These are always written on the right hand side in the chemical equation.

LONG ANSWER QUESTIONS:

Q:1: What is law of conservation of mass? Give examples.

Ans: Law of conservation of mass:

Introduction:

The French chemist Lavoisier, (1785) tried to learn about chemical changes by weighing the quantities of substances used in chemical reactions. He found that when a chemical reaction was carried out in a closed system, the total weight of the system was not changed.

Statement:

Its states that mass is neither created nor destroyed during a chemical reaction. In other words, in any chemical reaction the initial weight of the reacting substance is equal to the final weight of the product.

Example:

Law of conservation of mass may be demonstrated by the union of hydrogen (H_2) and oxygen (O_2) to form water. If the hydrogen and oxygen are weighed before the chemical reaction it will be found that their combined weight is always equal to the weight of water formed.

Q:2: What is law multiple proportions? Explain and examples.

Ans: Law of multiple proportion:

Introduction: The fact that the same element, can combine more than one ratio to from different compounds was published by Jhon Dalton, (1803), in the form of law of multiple proportion.

Statement: It states that if two elements combine to form more than one compounds. The masses of one element that combine with a fixed mass of the other element are in the ratio of small whole numbers or simple multiple ratio.

Example: Carbon (C) forms two stable compounds with oxygen (O) namely carbon monoxide and carbon dioxide.

Compounds	Mass of carbon	Mass of oxygen	Ration of oxygen
Carbon monoxide	12	16	1
Carbon dioxide	12	32	2

The different masses of oxygen 16 to 32 which combines with the fixed mass of carbon (12g) are in the ratio of 16:32 or 1:2 which is simple whole number ratio, and obeys the law of multiple proportion.

Another illustration of this law is the formation of water and hydrogen peroxide from hydrogen and oxygen.

Compounds	Mass of hydrogen	Mass of oxygen	Ration of oxygen
Water	2	16	1
Hydrogen peroxide	2	32	2

Q:3: Describe the types of chemical reactions.

Ans: Types of Chemical reactions:

Chemical reactions can be divided commonly into five different types.

Decomposition reaction.
Addition reaction or combination reaction.
Single displacement reaction.
Double displacement reaction.
Combustion reaction.

1. Decomposition Reaction:

A reaction in which a chemical substance breaks down to form two or more simpler substances is known as decomposition reaction. These reactions require some energy for the decomposition of the substances. For example; calcium carbonate decomposes into calcium oxide and carbon dioxide in the presence of heat.

$$Caco_3 \longrightarrow Cao + Co_2$$

Similarly, potassium chlorate produces two simpler substances e.g. potassium chloride and oxygen gas on heating.

$$2KCLO_3 \longrightarrow 2Kcl + 3O_2$$

Addition reaction (Combination reaction):

A reaction in which two or more substances combine to form a single substance is known as an addition or combination reaction. These reactions are reverse of decomposition reaction. For example; calcium oxide (Cao) reacts with carbon dioxide (CO_2) to form calcium carbonate.

$$CaO + CO_2 \longrightarrow CaCO_3$$

Another example is, when sodium reacts with chlorine gas it gives new substances known as sodium chloride or common slat (NaCl).

$2Na + Cl \longrightarrow 2Nacl$

Single displacement reaction: A reaction in which one atom or group of atoms of a compound is replaced by another atom or group of atoms is known as single displacement reaction. Some metals react with acids, bases or even water to displace hydrogen (H_2) gas.

For example, zinc replaces hydrogen in hydrogen chloride (HCL) to give zinc chloride. When chlorine reacts with a solution of potassium bromide, chlorine replaces bromide to form KCL and Br_2.

$Cl_2 + 2KBr \longrightarrow 2Kcl + Br_2$

Double Displacement reaction:

It is a reaction in which two compounds exchange their partners, so that two new compounds are formed. In double displacement reaction usually there is an exchanged of ionic radical. For example, when sodium chloride (NaCl) is reacted with silver nitrate ($AgNo_3$) solution, they exchange theirpartners to form two different compounds e.g. silver chloride (AgCL) and sodium nitrate. ($NaNo_3$).

$NaCl + AgNo_3 \longrightarrow NaNo_3 + AgCL$

Consider another example, when calcium chloride ($CaCl_2$) is reacted with sodium carbonate (Na_2CO_3) they exchange their partners to form two new compounds, sodium chloride and calcium carbonate.

$CaCl_2 + Na_2CO_3 \longrightarrow 2NaCL + CaCO_3$

Combustion Reaction:

A reaction in which substances react with either free oxygen or oxygen of the air, with the rapid release of heat and flame is known as combustion reaction. For example, when methane (CH_4) gas burns in air, it forms carbon dioxide gas (CO_2) water (H_2O) and heat.

Q.5: Balance the following reactions:

(a) $C + O_2 \longrightarrow CO$

Ans: $2C + O_2 \longrightarrow 2CO$

(b) $CO + O_2 \longrightarrow 2CO$

Ans: $2CO + O_2 \longrightarrow 2CO_2$

(c) $KNO_3 \longrightarrow KNO_2 + O_2$

Ans: $2KNO_3 \longrightarrow 2KNO_2 + O_2$

(d) $NaHCO_3 + HCL \longrightarrow Na_2CO_3 + H_2O + CO_2$

Ans: $2NaHCO_3 + HCL \longrightarrow Na_2CO_3 + H_2O + CO_2$

(e) $CaCO_3 + HCL \longrightarrow CaCl_2 + H_2O + CO_2$

Ans: $CaCO_3 + 2HCL \longrightarrow CaCl_2 + H_2O + CO_2$

Q.6: Which of the following reactions is either a decomposition reaction and combination reaction.

(a) $MgCO_3 \longrightarrow MgO + Co_2$

Ans: Decomposition reaction

(b) $C_2H_4 + H_2 \longrightarrow C_2H_4$

Balancing the equation:

$C_2H_4 + 2H_2 \longrightarrow C_2H_4$

Ans: Addition reaction

(c) $BaCO_3 \longrightarrow Ba + CO_3$

Ans: Decomposition reaction.

Chapter 8

STRUCTURE OF ATOM

EXERCISE

1. CHOOSE THE CORRECT ANSWER:

1. _____ a Greek philosopher proposed that matter is made up of extremely small particles, the atom.
   a. Democritus b. Plato c. Aristotle

Ans: Democritus

2. John Dalton in _____ published theory of atom assuming that atoms are the ultimate indivisible particles of matter.
   a. 1806 b.1807 c. 1808

Ans: 1808

3. All elements are made up of small indivisible. indestructible particles called _____.
   a. Atoms b. ions c. Molecule

Ans: Atoms

4. Electron was discovered by _____.
   a. M. faraday b. Goldstein
   c. James Chadwick

Ans: M Faraday

5. Proton was discovered by _____.
   a. M. faraday b. Goldstein
   c. James Chadwick

Ans: Goldstein

6. Neutron was discovered by _____.
   a. M. faraday b. Goldstein
   c. James Chadwick

Ans: James Chadwick

7. Electron is _____ charged particle.
   a. Negative b. positive c. neutral

Ans: Negative

8. Proton is _____ charged particle.
   a. Negative b. positive c. neutral

Ans: Positive

9. Neutron is _____ charged particle.
   a. Negative b. positive c. neutral

Ans: Neutral

10. The nucleus of an atoms consists of _____.
    a. Electron & proton b. Electron & neutron
    c. proton & Neutron

Ans: Proton and neutron

SHORT ANSWER QUESTIONS:

Q:1: What is atom?

Ans: Atom:

In the fifth century (B.C) the Greek philosopher Democritus expressed the belief that all the matter consists of very small indivisible particles, which he named atom.

Q:2: What was concept of Democritus about atom?

Ans: Concept of Democritus about atom:

Democritus, A Greek philosopher, proposed that matter is made up extremely small particles, the atom. The name atom comes from Greek language meaning indivisible.

Q:3: Define Atomic Number and mass Number.

Ans: Atomic Number:

The number of protons in the nucleus of an atom is known as atomic number. For example, the atomic number of carbon (C) is 6. This means that each atom has 6 protons and 6 electrons in it.

Notation:

The atomic number of Nitrogen is 7. It means that Nitrogen atom has 7 protons and 7 electrons in it. Atomic number is denoted by Z. It can be found by the following formula.

$$Z = A - N$$

Mass Number:

The sum of the number of neutrons and protons in the nucleus of an atom is known as mass number. It is also known as atomic mass.

Notation:

Mass number is denoted by A.

Mathematically:

Mass number (A) = number of protons (P) + number of neutrons (N). It can be found with the help of given formula.

$$A = P + N$$

LONG ANSWER QUESTION:

Q:1: Describe the discovery of electron.

Ans: Discovery of electron:

History:

The fundamental particle carrying a negative charge was discovered in 1897, by the British Physicist J. J Thomson.

Apparatus:

The apparatus used for the discovery of negative charge particle is known as discharge tube which consists of:

Glass

Metallic Electrodes

High voltage source

Vacuum Pump

Construction of discharge tube:

It is a simple tube filled with a gas and fitted with two metallic electrodes, which are connected to a high voltage battery. The tube is connected to a vacuum pump in order to reduce the pressure inside the tube.

Working:

A high voltage is supplied across the electrodes at very low pressure (00.1) atmosphere.

Q:2: Describe the discovery of proton.

Ans: Discovery of Proton:

Clue about Proton:

Since atoms are electrically neutral and electrons carry negative charge. It follows that for each electron, there must be one equivalent positive charge to neutralize the that electron. This particle is known as proton. The knowledge about proton was derived as a result of the study of electric discharge in the

discharge tube by the German Physicist Goldstein in 1886.

Apparatus:

The apparatus required for this experiment consists of Glass.

Metallic electrodes (perforated cathode).

High voltage source.

Construction of discharge tube:

A simple discharge tube consists of a glass tube fitted with two metallic electrodes at other end. These electrodes are connected to a high voltage source. The perforated electrodes which is connected to the negative terminal, known as cathode and the other which is connected to positive terminal, known as anode.

Working:

Goldstein conducted a series of process during his experiment. He reduced pressure from higher to very low limits.

Observation:

Goldstein observed that fluorescence at the end of the tube opposite to the anode due to the rays which are flowing opposite to the cathode rays.

Conclusion:

Positive rays consist of positively charged particle called protons.

Chapter 9

PERIODICITY OF ELEMENTS

EXERCISE

(1) CHOOSE THE CORRECT ANSWER.

1. In _____ Johann Dobereiner, noticed that of three elements with very similar chemical behavior.
   a. 1827 b. 1828 c. 1829

Ans: 1829

2. "Central atom of each set of triad had an atomic mass almost equal to the arithmetic mean of the atomic masses of other two elements. It is the statement of _____.
   a. Dobereiner b. Newland c. Mendeleev

Ans: Dobereiner

3. The arithmetic mean of Lithium and potassium is _____.
   a. 7 b. 23 c. 39

Ans: 23

4. The rule of triad was introduced by _____.
   a. Dobereiner b. Newland c. Mendeleev

Ans: Dobereiner

5. The repetition of properties after regular intervals is called:
   a. Periodicity b. Predictability c. Productivity

Ans: Periodicity

6. Lother Meyer's curve included about _____ elements.
   a. Thirty-three b. Fifty-six c. sixty-six

Ans: Fifty-six

7. _____ put forward his periodic law in 1869.
   a. Dobereiner b. Newland c. Mendeleev

Ans: Mendeleev

8. To which family does Ga belong to?
   a. Boron b. Carbon c. Nitrogen

Ans: Carbon

9. Mendeleev's periodic table contain ____ periods.
   a. 8 b. 12 c. 14

Ans: 12

10. The _____ period contains two elements, hydrogen and helium.
    a. First b. Second c. Third

Ans: First

SHORT ANSWER QUESTIONS.

Q:1: What is periodicity?

Ans: Periodicity:

The recurrence of chemical and physical properties of elements at regular interval in the periodic table is known as periodicity.

Q:2: What is rule of triad?

Ans: Rule of triad:

Introduction:

In 1829, Jhon Dobereiner, noticed that of the three elements with very similar chemical behavior i.e. Calcium (Ca), Strontium (Sr) and Barium (Ba), the atomic mass of the middle element i.e. Sr is almost the

arithmetic mean of the other two. This led him to call this group of three elements, a triad or rule of triad.

Statement:

Central atom of each set of triad had an atomic mass almost equal to the arithmetical mean of the atomic masses of other two elements.

Q:3: State Newland's law of octave.

Ans: Introduction:

In 18863, Jhon Newland, A London industrial chemist proposed Newlands law of octave.

Statement:

If elements are arranged in the order of increasing atomic masses. The element starting from a given one, has similar properties as first one i.e, its properties are a kind of repetition of the first like the eighth note in an octave of music.

Q:4: What was the work of lother Mayer?

Ans: Julius Lother Meyer, a German chemist and scientist, in December 1869 published a periodic table, in which the known 56 elements were arranged on the basis of their atomic masses in nine vertical columns of group from I to IX, but he laid down emphasis on the physical properties of elements.

He observed that the elements with similar properties of occupy similar position on the curve. For example, the highly reactive metals (Li, Na, K, Rb, Cs) occupy the peaks, there by showing that these elements are same in properties.

Q:5: Define Mendeleev's classification.

Ans: Mendeleev's classification:

Introduction:

In March 1869 Dimitri Mendeleev a Russian chemist arranged the elements in order of increasing atomic mass, placing the elements increasing atomic mass, placing the elements with similar chemical properties vertically beneath each other.

Statement:

The physical and chemical properties of elements are a periodic function of their atomic weight. The periodic table published by Mendeleev consisted of eight vertical columns called groups (i.e Group I to VIII) and horizontal rows called series. Nowadays these series are called periods.

Q:6: What is modern periodic law?

Ans: Modern Periodic Law:

Introduction:

The arrangement of elements on the basic of their atomic masses left many anomalies in the position the different elements in the periodic table. the modern periodic table is the result of discovery of atomic number by, Moseley in 1914.

Statement:

The physical and chemical properties of all elements are periodic functions of their atomic numbers.

LONG ANSWER QUESTIONS.

Q:1: Explain Newland's law of octave. How this law provided the larger scope for the classification of elements?

Ans: Newland's law of octave:

Introduction:

In 18863, Jhon Newland, A London industrial chemist proposed Newlands law of octave.

Statement:

If elements are arranged in the order of increasing atomic masses. The element starting from a given one, has similar properties as first one i.e, its properties are a kind of repetition of the first like the eighth note in an octave of music.

Scope of Newland's law of octave for the classification of elements:

This arrangement of elements for the first time brought to light the existence of periodicity i.e. recurrence of chemical and physical properties of at regular interval and provided a great idea towards the development of modern periodic table and classification of elements.

Q:2: State Mendeleev's periodic law. Write down salient features of table.

Ans: Mendeleev's Periodic law:

Introduction:

In March 1869 Dimitri Mendeleev a Russian chemist arranged the elements in order of increasing atomic mass, placing the elements increasing atomic

mass, placing the elements with similar chemical properties vertically beneath each other.

Statement:

The physical and chemical properties of elements are a periodic function of their atomic weight. The periodic table published by Mendeleev consisted of eight vertical columns called groups (i.e Group I to VIII) and horizontal rows called series. Nowadays these series are called periods.

Salient features of Mendeleev's periodic table:

It has eight vertical columns called groups and twelve horizontal rows called periods.

Elements in each vertical column have similar properties.

Vacant spaces were left for the elements not discovered then. He proposed their names as eka-boron, eka- aluminium and eka-silicon.

Q:3: How do you understand by long form of periodic table?

Ans: Long form of Modern Periodic table:

The modern periodic table is the result of discovery of atomic number by Mosely in 1914. Based on the concept of atomic number, Werner and Bury proposed the modern periodic table.

The modern periodic table contains seven horizontal rows called periods and sixteen vertical columns called groups.

Periods:

The elements within a period have dissimilar properties from left to right.

First period:

It contains only two elements i.e. H and He. It is the shortest period with two elements.

Second and third periods:

Each of these periods contains 8 elements. The second period starts with Li and ends up with Ne, whereas the third period starts with Na and ends at Ar.

Fourth and fifth period:

Each of these periods contains 18 elements. The fourth starts form K and ends at Kr, whereas fifth period starts form Rb and ends at Xe.

Sixth period:

It contains 32 elements. It starts from Cs and ends with Rn. Besides, fourteen elements called lanthanides are placed at the bottom of the periodic table.

Seventh period:

It starts with francium (Fr). This period is incomplete as about 109 elements have been discovered. This period also includes a group of fourteen elements starting from Actinium (Ac). These elements are called actinides. They are also placed at the bottom of the periodic table.

Groups:

The vertical columns are called groups. Basically there are eight groups (I to VIII).

Group IA (The Alkali Metals) or (Lithium Family):

It includes Lithium (Li), Sodium (Na), Potassium (K), Rubidium (Rb), Cesium (Cs) and Francium (Fr).

Group IIA (Alkaline Earth Metals) or (Beryllium Family):

It includes Beryllium (Be), Magnesium (Mg), Calcium (Ca), Strontium (Sr), Barium (Ba) and Radium.

Group IIIA (Boron Family):

It includes Boron (Br), Aluminium (Al), Gallium (Ga), Indium (In) and Thallium (Tl).

Group IV A (Carbon Family):

It includes Carbon (C), Silicon, (Si), Germanium (Ge), Tin (Sn) and lead (Pb).

Group V A (Nitrogen Family):

It includes Nitrogen (N), Phosphorus (P), Arsenic (As), Antimony (Sb) and Bismuth (Bi).

Group VI A:

It includes Oxygen (O), Sulphur, Selenium (Se), Tellurium (Te) and Polonium (Po).

Group VII A (The Halogens):

It includes Fluorine (F), Chlorine (CL), Bromine (Br), Iodine (I) and Astatine (At).

Group VIII A (Inert or Noble Gases):

It includes Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe) and Radon (Rn).

Q:4: What does the modern periods law differ from Mendeleev's periodic law? Explain clearly groups and periods in the modern periodic table.

Ans: The difference between Mendeleev's periodic law and modern periodic law is under as following.

In march 1869 Dimitri Mendeleev a Russian chemist ranged the elements in order of increasing atomic mass, placing the elements with small chemical properties vertically beneath each other, By doing so he overeat that the properties elements with slight modifications repeated themselves at intervals. So he put forward his periodic law which states that.

The physicals and chemicals properties of elements are a parodic function of their atomic weights." The periodic table published by Mendeleev consisted of eight verticals columns called group (i.e group I to VIII) and horizontal rows called series. Now a day these series are called periods.

MODERN PERIODIC TABLE

The arrangement of elements on the basic of their atomic masses left many anomalies in the position of different elements in the periodic table. Moreover the existence of isotopic shoed that the atomic mass of an elements is not the fundamental property of an elects

The modern parodic table is the result discovery of atomic number by Mosely in 1914.

Based on the concept of atomic number Bohr Werner and Bury proposed the Modern "Modern parodic Law" which states that "the physical and

chemicals properties of all elements are periodic function of their atomic number."

The modern periodic table contains seven Horizontal row called periods and sixteen vertical columns called groups.

Chapter 10
STUDY OF MATTER AND ENERGY (PHYSICS)

(1) CHOOSE THE CORRECT ANSWER.

1. The word "Physics" is come from _____ word Physikos, meaning natural.
   a. Latin b. Greek c. French

Ans: Greek

2. The branch of science that deals with the properties of matter and energy is called _____.
   a. Biology b. Chemistry c. Physics

Ans: Physics

3. Kitabul-Manazir was famous book of _____ on optics.
   a. Ibn-al-Haitham b. Al-Kindi c. Al- Beruni

Ans: Ibn-al-Haitham

4. Ibn Al- Haitham contributed toward _____ Physics.
   a. Nuclear b. Optical c. Thermal

Ans: Optical

5. He discovered that nature of light and told it is a kind of energy.
   a. Ibn-al-Haitham b. Al-Kindi c. Al- Beruni

Ans: Ibn-al-Haitham

6. He invented a pin hole camera and with this he obtained an image of the sun eclipse.
   a. Ibn-al-Haitham b. Al-Kindi
   c. Al- Beruni

Ans: Ibn-al-Haitham

7. He gave the laws of reflection.
   a. Ibn-al-Haitham b. Al-Kindi
   c. Al- Beruni

Ans: Ibn-al-Haitham

8. He measured the circumference of the Earth.
   a. Ibn-al-Haitham b. Al-Kindi c. Al- Beruni

Ans: Al-Beruni

9. The name of Muslim scientist who was born in Basra and made several discoveries on music was.
   a. Ibn-al-Haitham b. Al-Kindi c. Al- Beruni

Ans: Al-Kindi

10. Dr. Abdul Salam was awarded Nobel Prize for his work on:
    a. Electronics b. Radiation
    c. Grand unification theory

Ans: Grand unification theory

SHORT ANSWER QUESTIONS:

Q:1: What are laws of nature?

Ans: Laws of Nature:

Almighty Allah created this universe billions of years ago with a single word "be" and at once it come into being. He inducted several principles and laws in it to sustain its function. Now from the day of their creation every particle of the universe is following these laws. These laws are known as laws of nature.

Q:2: What is physics?

Ans: Physics:

The word Physics is come from a Greek word Physikos meaning natural. It is defined as a science that deals with the interaction of matter and energy.

Q:3: Name branches of physics?

Ans: Branches of Physics:

The physicists have divide the subject of Physics into various branches. The main branches of Physics are under as following.

i. Mechanics
ii. Electricity
iii. Electromagnetism
iv. Solid state physics
v. Atomic Physics
vi. Plasma Physics
vii. Nuclear Physics
viii. Bio Physics
ix. Astro Physics

Q:4: Write a short note on Ibn-al-Haitham

Ans: Ibn-al-Haitham:

1. Ibn-al-Haitham was a great scholar of Physics, mathematics, engineering, astronomy and medicine.
2. He worked in optics.
3. He gave the formal definition of ray of light.
4. He discovered that nature of light and told that it is a kind of energy.

5. He invented pin hole camera.
6. He gave the laws of reflections.
7. He wrote many books and Kitab-al-Manazir was a great milestone on optics.

Q:5: write a short note on Dr. Abdul Qadeer Khan

Ans: Dr. Abdul Qadeer Khan:

1. He was born on 1st April, 1936 at Bhopal in India.
2. He obtained M.Sc. Metallurgy degree from Holland. He was selected as research assistant in the same university.
3. He obtained Ph.D. degree from the university of Leaven Belgium.
4. He worked as an expert at Urenco Enrichment plant in Holland as a joint venture of the government of Holland.
5. When Dr. Abdul Qadeer Khan imbued with the supreme spirit of patriotism, he returned to Pakistan to serve his motherland.
6. He contributed in making Pakistan a nuclear state.
7. He has been awarded Hilal-e-imtiaz by the government of Pakistan.

LONG ANSWER QUESTIONS:

Q:1: Describe various branches of physics.

Ans: Branches of Physics:

The physicists have divide the subject of Physics into various branches. Each branch has acquired a

title of full subject nowadays. The main branches of Physics are under as following.

i. Mechanics
ii. Electricity
iii. Electromagnetism
iv. Solid state physics
v. Atomic Physics
vi. Plasma Physics
vii. Nuclear Physics
viii. Bio Physics ix. Astro Physics

i. Mechanics:

It deals with the motion of objects with or without reference of force.

ii. Electricity:

It is concerned with the phenomenon and effects of related to electric charge.

iii. Electromagnetism:

It deals observation, principles, laws and methods that relate and magnetism.

iv. Solid state physics:

It is concerned with the structure and properties of solid objects.

v. Atomic Physics:

It is concerned with the structure and properties of the atom.

vi. Plasma Physics:

It is concerned with the properties of highly ionized atoms forming a mixture of bare nuclei (nuclei without electrons).

vii. Nuclear Physics:

It is concerned with the structure, properties and reactions of the nuclei of atoms.

viii. Bio Physics:

It is concerned with the applications of physical methods and explanation of bio-physical systems and structure.

ix. Astro Physics:

It is concerned with the study of the physics of astronomical bodies.

Q:2: Write a detailed note on the contribution of the Muslim scientists.

Ans: Contribution the Muslim scientists:

In Abbasid period Baghdad was a great centre of learning and knowledge. Scientists and intellectuals from all over the world came here to quench their thirst for knowledge. Caliph was a lover of knowledge and he encouraged learners and scholars for their remarkable achievements in the field of Physics. The contribution of some renowned scientists in the field of Physics is under as following.

Ibn-al-Haitham:

- Ibn-al-Haitham was a great scholar of Physics, mathematics, engineering, astronomy and medicine.
- He worked in optics.
- He gave the formal definition of ray of light.
- He discovered that nature of light and told that it is a kind of energy.
- He invented pin hole camera.

- He gave the laws of reflections.
- He wrote many books and Kitab-al-Manazir was a great milestone on optics.

Yakub Ibne Ishaq Alkindi:

- Yakub Ibne Ishaq Alkindi was born in Basra.
- He produced several research monographs on meteorology, specific gravity and on tides.
- He worked in the field of sound and optics.
- He explained the musical notes on scientific ground and discovered a method to express the notes in term of frequency.
- He also discussed the nature of sound.

Dr. Abdul Qadeer Khan:

- He was born on 1st April, 1936 at Bhopal in India.
- He obtained M.Sc. Metallurgy degree from Holland. He was selected as research assistant in the same university.
- He obtained Ph.D. degree from the university of Leaven Belgium.
- He worked as an expert at Urenco Enrichment plant in Holland as a joint venture of the government of Holland.
- When Dr. Abdul Qadeer Khan imbued with the supreme spirit of patriotism, he returned to Pakistan to serve his motherland.
- He contributed in making Pakistan a nuclear state.
- He has been awarded Hilal-e-imtiaz by the government of Pakistan.

Dr. Abdul Salam:

- He was born in Jhang, a small city in Pakistan in 1926.
- He passed every examination with distinction.
- He was awarded scholarship for higher studies in U.K.
- He was awarded noble prize in Physics in 1979 for his work on grand unification theory (GUT).
- He established international centre for theoretical Physics at Trieste, Italy where scientist from the developing countries are provided opportunities to augment their research work.

Q:3: Write down the importance of physics.

Ans: Importance of Physics:

In our delay life we use many things as a routine. But we seldom think how they are made. We use several electric appliances in our homes. For examples, electric fan, electric bold, refrigerator, air conditioner, juicer grinder, etc. they all use electric power we use buses cress, railway carriages aero lanes etc, for long distances. All of these are run by engines. Of these vehicles are manufactured on the principles of hemodynamics We see the events far away from us on the television screen and enjoy various programmers telecast from the T.V stations. In element device and application solid state physicals plays a Vital role. Laser technology is webeye used in defense system metallurgy medicals science and astronomy which has

its roots in automatic physicals Many centuries including Pakistan utilize nuclear energy to producer electric power productions of nuclear energy is the area of nuclear physical.

We can see that in every walk of life physical is involved in one way or the other. Thus physical is playing vital role in farming our life style and influencing our way of thinking.

Chapter 11

MEASUREMENT

(1) Choose the correct answer.

1. A set of fundamental and derived units is known as _____.
   a. system of units b. system of matrix
   c. system of quantity

Ans: System of units

2. _____ system of units is convenient for scientific work.
   a. S.I b. CGS c. BE

Ans: S.I

3. _____ system is an old system.
   a. S.I b. CGS c. BE

Ans: CGS

4. The S.I unit of time is _____.
   a. Second b. Centimeter c. Meter

Ans: Second

5. The fundamental unit of length in S.I system is _____.
   a. Second b. Centimeter c. Meter

Ans: Meter

6. The standard meter is made of _____ and is placed at the international Bureau of weight and measures is seven, near Paris.
   a. Platinum and copper b. Iron and Iridium
   c. Platinum and Iridium

Ans: Platinum and Iridium

7. One meter is equal to _____.

   a. 10^4mm b. 10^3mm c. 12^2mm

Ans: 10^3mm

8. 10^{-9} second is called a _____.
   a. Deci-second b. Milli-second
   c. Nano-second

Ans: Nano-second

10. 1 Kilogram = _____gm.
    a. 10 b. 100 c. 1000

Ans: 1000

11. The S.I unit of temperature is _____.
    a. Second b. Mole c. Kelvin

Ans: Kelvin

12. An instrument which can measure length correct up to 0.1mm.
    a. Vernier caliper b. Screw Gauge
    c. Kelvin

Ans: Vernier caliper

13. Length, mass, time, temperature, electric current and light intensity are _____ quantities.
    a. Base b. Derived c. None of these

Ans: Base

SHORT ANSWER QUESTIONS:

Q:1: What is measurement?

Ans: Measurement:

Measurement is the common practice of everyday life. This routine work starts from morning till late hours at night.

Definition of measurement:

The comparison of physical quantities with their standard units with the help of standard measuring instruments is known as measurement.

Q:2: Write importance of measurement?

Ans: Importance of measurement.

Measurement is the common practice of everyday life. This routine work starts from morning till late at night. Every morning a milk man comes and gives a measured volume of milk to the house hold with the help of his measuring cylinder graduated in in halves of deciliter. If one goes to stop to purchase sugar, the shopkeeper will weigh the required amount of sugar by his common balance and will handover it to the purchase. To purchase cloth one goes to the shop and shopkeeper will measure the required length of cloth by his meter scale graduated in centimeters.

Q:3: What is fundamental quantities?

Ans: Fundamental quantities:

In Physics length, mass and time are supposed to be the fundamental quantities.

Q:4: What are derived quantities?

Ans: Derived quantities:

All physical quantities derived from the fundamental quantities are known as derived quantities.

Q:5: What is system of units?

Ans: System of units:

A set of fundamental and derived units is known as system of units. There are three system of units being used in scientific work.

For examples:

MKS or (CGS) System
British Engineering System
The S.I System

Q:6: Name the seven fundamental units.

Ans: Seven fundamental unit:

Physical quantity	S.I Units
i. Length	Metre (m)
ii. Mass	Kilogram (Kg)
iii. Time	Second (S)
iv. Electric current	Ampere (A)
v. Temperature	Kelvin (K)
vi. Luminous Intensity	Candela (Cd)
vii. Amount of current	Mole (Mol)

Q:7: Name the seven derived units.

Ans: Seven derived unit:

Physical quantity	S.I Units
i. Velocity	Meter per second (m/s)
ii. Acceleration	Meter per second square (m/s^2)
iii. Volume	Cubic meter (m^3)
iv. Force	Newton (N)
v. Pressure	Pascal (Pa)
vi. Work	Joule (J)
vii. Electric charge	Coulomb (C)

Q:8: With what instrument can you find length mass and time?

Ans: Instrument using for the measurement of length:

Meter scale, meter tape and ruler are used to measure the length.

Instrument using for the measurement of mass:

Physical balance and electronic balance are used to measure the mass.

Instrument using for the measurement of time:

Wall clock, wrist watch and stop watch are used to measure the time.

Q.9: Define:

(a) standard of length (b) standard of time

Ans: Standard of length:

The SI unit of length is meter. Metre is defined as the is length of the path travelled by light in vacuum during a time interval of 1/299,792,458 of a second.

Standard of time:

The SI unit of time is second. A second is defined as to be exactly equal to the time interval of 9,192,6 31,770 vibrations of atoms of cesium 133.

LONG ANSWER QUESTIONS:

Q:1: What is Vernier caliper? Describe its structure and working.

Ans: Vernier caliper:

Definition of Vernier caliper:

It is an instrument used to measure the length or distance up to 0.1mm.

Structure of Vernier caliper:

It consists of a graduated centimeter bar (strip) known as main scale with a moveable scale of 10 divisions know as Vernier scale. It has two sets of jaws for the measurement of internal and external diameter of cylindrical objects.

Working of Vernier caliper:

The diameter of small spherical object can be measured with help of Vernier caliper. Before the measurement, close the jaws of Vernier caliper completely and note down whether the zero line of the Vernier scale coincides with the zero line the main scale. Now open the jaws and place an object between them. Read the main scale division to the left of the zero of the Vernier scale.

Q:2: What is Screw Gauge? Describe its structure and working.

Ans: Definition of screw gauge:

It is an instrument used to measure the length or diameter up to 0.01mm.

Structure of screw gauge:

A micrometer screw gauge consists of a fine screw of usually 1 or 0.5 mm pitch, which moves when rotated through a nut, screw gauge has a linear scale, which is parallel to the axis of the screw and is known as the main scale and the circular scale which is divided into 100 or 50 divisions.

Working of the screw gauge:

Before using the screw gauge for making any measurement, find out its pitch, least count and zero error. Then place an object whose length or diameter is to be measured between its stud. Close the stud gently such that both the studs are in contact with the object. Then main scale and circular scale readings are taken. To take the circular reading, note the circular scale division which exactly. Multiply circular scale reading by its least count, it will be in centimeter, it is called fractional point. Now Add the main scale reading and the fractional part get total reading.

Q:3: Define any two of the following:

(a)Physics balance (b) Stop watch

(c) Measuring Cylinder

Ans: (a)Physics balance:

It consists of a horizontal beam resting at the middle point a central knife edge. Two similar pans are suspended on two more knife edges near each end of the beam. A long pointer capable of swinging on a scale is attached to the middle of the beam.

The physical balance is levelled on a table by means of levelling screws. The beam is set free by rotating the arresting knob at the front of the balance. The pointer is brought at the middle of the scale by means of two adjusting screws provided at each end of the beam. The arresting knob is turned to arrest the beam. The balance pans are cleaned. The object is placed on the left pan and the standard masses on the

right pan. The beam is set free by turning the arresting knob. The pointer moves towards the side of smaller masses. The standard mass in the pan is adjusted to find the mass of the object.

(b) Stop watch:

A stop watch is used to measure the time interval of an event. There are two types of stop watch.

i. Mechanical stop watch

ii. Digital stop wacth

i. Mechanical stop watch:

A mechanical stop watch is commonly used in labortaries, can measure a time interval as small as 1/100 seconds or o.o1 seconds.

(c) Measuring Cylinder

A measuring cylinder is a glass or transparent platic cylinder. It has a scale along its length that indicates the voulme in millimeter (ml).

Q:4: What is physics quantity? Discuss in detail.

Ans: Physical quantity:

A quantity which can be measured is known as physical quantity. All measureable quantities are called physical quantities.

Length, mass, time, temperature, electric current and light are the fundamental quantities.

All physical quantities which can be derived from fundamental quantities are known as derived quantities. For examples; velocity, acceleration, etc.

To measure a physical quantity, we need a certain unit.

A physical quantity possesses at least two characteristics in common. One is its numerical magnitude and the other is the unit in which it is measured.

Chapter 12

FORCE AND FRICTION

Exercise:

(1) Choose the correct answer.

1. _____ is defined as a push or a pull acting on object.
   a. Force b. power c. pressure

Ans: Force

2. Force is measured in _____.
   a. Kelvin b. Newton c. Candela

Ans: Newton

3. An object that is moving is said to be in _____.
   a. Force b. Motion c. Rest

Ans: Rest

4. _____ can cause an object at rest to motion.
   a. Force b. Motion c. Rest

Ans: Force

5. _____ can bring a moving object to rest.
   a. Force b. Motion c. Rest

Ans: force

6. It is the push or pull exerted by a machine to move the body or to bring it rest.
   a. Mechanical force b. Elastic force
   c. Magnetic force

Ans: Mechanical force

7. The force of _____ is defined as the force that offers resistance to motion.
   a. Gravitation b. Magnetism c. Friction

Ans: Friction

8. It is the force with which the earth pulls all objects towards its center.
   a. Electrical Force b. Mechanical Force
   c. Gravitational Force

Ans: Gravitational force

9. The unit of force is _____ named after sir Isaac Newton a great scientist.
   a. Pascal b. Joule c. Newton

Ans: Newton

10 Walking is possible because of the _____ between our shoes or feet and the floor.
   a. Friction b. power c. pressure

Ans: Friction

11. _____ reduces the speed of moving vehicles to a great extent.
   a. Friction b. Power c. Pressure

Ans: Friction

12. To _____ friction, machine parts which rub against each other are Lubricated using suitable oil or grease.
   a. Increase b. Reduce c. Pain

Ans: Reduce

SHORT ANSWER QUESTIONS:

Q:1: What is force?

Ans: Force:

Force is defined as a push or pull acting objects. It can be defined as an external (outside) agent that can change or affect:

The motion of the body.

The speed of the body.

The shape of the body.

Q:2: What is motion?

Ans: Motion:

If an object changes its position with respect of its surrounding, is said to be motion.

Q:3: What is relation between force and motion?

Ans: Relation between force and motion:

Force and motion are closely related. We use force to perform action. Actions such as turning on a tap, picking up a school bag or opening a door all require force. Even the earth is exerting a force on us all the time. It is pulling all things towards. This is why things fall down if you toss them up.

Q:4: Define any three effects of force.

Ans: Three effect of force:

- Force can cause an object at rest to move.
- Force can bring a moving object to rest.
- Force can change the direction of an object.

Q:5: Name the types of motion.

Ans: Types of motion:

There are three types of motion.

- Translatory motion or linear motion.
- Rotatory motion.
- Vibratory motion or oscillatory motion

Q:6: What is force of Friction?

Ans: Force of friction or Frictional force:

The force of friction is defined as the force that offers resistance to motion. This motion comes into resistance only when the surfaces of two objects in contact move with respect to each other. For example; if role a ball on the floor, it will come to rest after some time because of friction.

Q:7: What is gravitational force?

Ans: Gravitational force:

It is a force with which the earth pulls all object towards its centre, e.g. a ripe mango falls down towards the ground from the tree. If you release a ball from your hand, it immediately starts falling towards the ground even though you did not push it. It is the gravitational force that keeps us bound to the earth.

Q:8: Distinguish between mass and weight?

Ans: Distinguishing between mass and weight:

Following are the differences between mass and weight.

Mass	Weight
i. The quantity of matter presented in the body is called mass.	i. It is force by which the earth attracts a body towards its center.
ii. ii. The mathematical relation of mass is m= F/a	ii. The mathematical relation of weight is W=mg.

ii. The mass of body is constant everywhere , its value is not changed even at every for the surface of the earth.	iii. The weight is the force which is not constant. Its value is changed at different places.
iv. The S.I unit if mass is kilogram (Kg).	iv. The S.I unit of weight is Newton (N).

Q:9: Write factors on which friction depends?

Ans: Factors on which friction depends:

The nature of surfaces in contact.

Weight of the body sliding over the surface.

LONG ANSWER QUESTIONS:

Q:1: Describe in detail the effects of force.

Ans: Effects of force:

Force can cause an object at rest to move.

Force can bring a moving object to rest.

Force can change the direction of an object

Force can change the speed of a moving objects.

Q:2: Explain the various types of force.

Ans: Types of force:

There are various types of force. They are as follows.

(i) Muscular force:

It is the force exerted by our muscles e.g. an auto driver uses his leg muscles to move the auto. A labourer uses muscles of his arms and shoulders to lift the load.

(ii) Elastic force:

When the body is stretched and then released, e.g. A catapult causes a small stone to shoot when it is stretched and then released.

(iii). Force of friction or Frictional force:

The force of friction is defined as the force that offers resistance to motion. This motion comes into resistance only when the surfaces of two objects in contact move with respect to each other. For example; if role a ball on the floor, it will come to rest after some time because of friction.

(iv) Gravitational force:

It is a force with which the earth pulls all object towards its centre, e.g. a ripe mango falls down towards the ground from the tree. If you release a ball from your hand, it immediately starts falling towards the ground even though you did not push it. It is the gravitational force that keeps us bound to the earth.

Q:3: Compare the advantages and disadvantage of friction in detail.

Ans: Advantages of friction:

- Friction between the head of the matchstick and the side of the matchstick makes it possible for us to light a matchstick.
- Friction between the pencil or tip of the pen and the surface makes it possible to write and draw.
- Walking is possible because of the friction between our shoes or feet and the floor.

- Driving would not be possible if there was no friction between the tyres and the road.

Disadvantages of friction:

- Due to friction between the sole of the shoes and the floor, the sole wears out.
- Machines parts which rub together wear out.
- In certain machines, different parts move against each other. Heat generated due to the friction damages these parts.
- Friction reduces the speed of moving vehicles to a great extent.

SOLVED MODEL PAPER FOR FIRST TERM

Subject Scienc Section: A (MCQ'S) Total Marks: 50

Q.1: SELECT THE CORRECT ANSWER.

1. Scientia means _____.
   a. to hide b. to tell c .to know

Ans: to know

2. Mitochondria are also known as _____
   a. Centre of cell b. Power house of the cell
   c. Protein factory

Ans: Power house of the cell

3. Scientific information is sometime called _____.
   a. Data b. Prediction c. Chart

Ans: Data

4. The study of life is called _____.
   a. Biology b. Space c. Non-living things

Ans: Biology

5. _____ is considered as one of the founder of medicine.
   a. Bu Ali Sina b. Al-Farabi
   c. Ali Bin Isa

Ans: Bu Ali Sina

6. _____ discovered antiseptics e.g. Iodine and carbolic acid.
   a. J-Lister b. E-Jennar
   c. Charles Darwin

Ans: J-Lister

7. In _____ Galileo, an Italian astronomer and Physicist developed simple microscope.
   a. 1610 b. 1620 c. 1630

Ans: 1610

8. In 1831 _____ discovered the nucleus of cell.
   a. Robert Hook b. Robert Brown
   c. Rudolf Virchow

Ans: Robert Brown

9. The basic unit of classification is _____.
   a. Species b. Genus
   c. Family

Ans: Species

10. The family of mustard is _____.
    a. Brassicasea b. Poaecceae
    c. Rosacceae

Ans: Brassicasea

SECTION B
(SHORT ANSWER QUESTIONS)
Marks: 24

NOTE: ATTEMPT ANY SIX QUESTIONS.

Q.1: What is Science?

Ans: Science:

The word science is derived from a Latin word "Scientia" meaning to known science is a way of knowing. Science is the study of nature. Science emerges from our curiosity about ourselves the world and the universe.

Q.2: Define biology. Name branches of biology.

Ans: Biology:

The word biology is come from two Greek words.

Bio= life

Logos= thinking reasoning or study.

Biology is the branch of natural science that deals with organism and different phenomenon of life.

Branches of Biology:

Extensive research during the 20th century has led to the division of Biology into some of the important branches of Biology are given below.

i. Botany ii. Zoology iii. Micro-biology
iv. Morphology v. Anatomy
vi. Histology or tissue Biology
vii. Cytology or cell Biology
viii. Physiology ix. Ecology
x. Genetics xi. Bio-chemistry
xii. Bio Physics xiii. Bio-metery.

Q.3: Write a short note biography of biology.

Ans: The word biology is composed of two Greek words "bios" meaning life and "logos" meaning study. It is the branch of natural science that deals with the life and all aspects of life.

Q.4: Define cell.

Ans: Cell:

Cell is the basic structural and functional unit of living organisms. Cell was discovered by Robert Hook in 1665. The word cell is derived from the Latin word cellulae which means chambers.

Q.5: What is nucleus?

Ans: Nucleus:

Nucleus is the most important part of the cell. Its envelop is known as the nuclear membrane, which is double membrane and porous. In the nucleus there is a granular matrix called nucleoplasm, in which one or two nucleoli and chromosomes are present. Nucleus controls all the functions of the cell.

Q.6: Define classification.

Ans: Classification:

The division of living things into different groups is known as classification.

Q.7: Define Taxonomy.

Ans: Taxonomy:

The scientific study which deals with the classification of living organism is known as taxonomy.

Section C (Long A/ Q) Marks: 16

Note: Attempt any two questions.

Q.1: What is cell theory? Write down its salient features.

Ans: Cell Theory:

In 1838, a German botanist Schleiden, proposed that all plants are made up of cells. Next year another German zoologist, Theodor Schwann stated that all animals are made up of cells. In 1858, Rudolf Virchow stated that new cells come only from other cells. i.e. animal cells come from animal cells and plant cells

come from plant cells. The combined efforts of Schleiden, Schwann and Rudolf Virchow finally gave rise to cell theory.

Salient Feature of cell Theory:

The salient features of cell theory are under.

All living organisms are composed of one or more cells. The cell is the smallest, basic structural and functional unit of all organisms. New cells are formed by the division of pre-existing cells.

Q.2: Describe the contribution of European scientists in the fields of biology.

Ans: **Contribution of European scientist in the field of Biology:**

1. After the 15th century, European and other biologists made important contribution in the field of biology.

William Harvey:

He described the circulation of blood.

Galileo:

He invented a microscope to examine small organisms.

Robert Hook:

He discovered cell, the basic unit of life.

J lister:

He discovered antiseptics e.g. Iodine and carbolic acid.

Edward Jennar:

He discovered method of vaccination against small pox.

Q.3: What is endoplasmic reticulum? Define its types.

Ans: Endoplasmic Reticulum:

It is the network of channels throughout the cytoplasm from nuclear membrane to the plasma membrane. It plays an important role in the transport of materials from one part of the cell to the other.

Types of Endoplasmic Reticulum:

There are two types of endoplasmic reticulum. Such as:

1. Smooth endoplasmic reticulum.
2. Rough endoplasmic reticulum.

1. Smooth endoplasmic reticulum:

It is non granular because ribosomes are not attached on it. These play an important role in lipids formation.

2. Rough endoplasmic reticulum:

It is granular because ribosomes in the form of small granules are attached on it, which are involved inn protein formation.

SOLVED MODEL PAPER
FOR SECOND TERM

Subject Science Section: A (MCQ'S) Total Marks:50

1. Viruses, discovered by _____ in 1892.
   a. Louis Pasture b. Iwanowsky
   c. Leeuwenhoek

Ans: Iwanowsky

2. Poliomyelitis is caused by _____ virus.
   a. Human immune b. Polio
   c. Influenza

Ans: Influenza

3. _____ was known as father of alchemy.
   a. Jabir Ibne Hayan
   b. Al Razi
   c. Al Beruni

Ans: Jabir Ibne Hayan

4. Oxygen was discovered by _____.
   a. J Black b. J Priestly c. Lavoisier

Ans: J Priestly

5. Electron was discovered by _____.
   a. M Faraday b. Goldstein
   c. Chadwick

Ans: M Faraday

SECTION B
(Short A/Q) Marks: 24

Note: Attempt any six questions.

Q.1: Which atomic particles has –Ve charge?

Ans: Electron has negative (-ve) charge.

Q.2: Give three salient features of cyano bacteria?

Ans: Salient features of cyanobacteria:

- These blue green algae are prokaryotic.
- They may occur alone or in the form of colony.
- Cell wall is double layered.

Q.3: Write a short note on J Priestly.

Ans: J Priestly:

J priestly discovered oxygen, Sulphur dioxide and hydrogen chloride. J Priestly is best known for his experiments with gases especially that which we now call oxygen.

Q.4: What is chemistry?

Ans: Chemistry:

It is the branch of science that deals with the study of composition, structure and properties of matter.

Q.5: What is atom?

Ans: Atom:

All the matters are composed of smallest particles known as atoms.

Q.6: What are the three fundamental particles of atom?

Ans: Fundamental particles of atom:

i. Electron ii. Proton iii. Neutron

Q.7: State law of conservation of mass.

Ans: Introduction:

The French chemist Lavoisier, (1785) tried to learn about chemical changes by weighing the quantities of substances used in chemical reactions. He found that when a chemical reaction was carried

out in a closed system, the total weight of the system was not changed.

Statement:

Its states that mass is neither created nor destroyed during a chemical reaction. In other words, in any chemical reaction the initial weight of the reacting substance is equal to the final weight of the product.

Q.8: Who discovered the nucleus of atom?

Ans: Neil Bohr discovered the nucleus of an atom.

Q.9: Define reactant and product.

Ans: Reactant:

The starting substance in the chemical reaction are called reactants. Reactants are always written on the left hand side in the chemical equation.

Product:

The substances which are formed by the reactants in the chemical reaction are known as products. These are always written on the right hand side in the chemical equation.

Section C (Long A/Q)

Marks: 16

Note: Attempt any two questions.

Q.1: Describe the detail the discovery and characteristics of viruses.

Discovery of Virus:

Viruses (Latin word Viron meaning poison) are the smallest, the simplest and perhaps most primitive living things. By 1800's many biologists had demonstrated that many diseases of man and other organisms were caused by Bacteria. Some diseases puzzled them. One such disease was tobacco mosaic disease occurring in tobacco plant leaves. In 1892 the Russian biologist, Iwanowsky showed that this disease was due to something smaller than Bacteria. He named them as viruses.

Characteristics of Viruses:

Viruses are non-cellular obligate parasites that always have a protein coat and a nucleic acid core. They cannot live and reproduce of living cells since they lack the ability to do so by themselves. They range in size from 20nm to 250nm (One nm = 10^{-9} metre). They are sub microscopic. There is no sexual or asexual reproduction. They reproduce by replication. The simple viruses use the enzymes of the host cell for both their protein synthesis and gene replication.

Q.2: Describe the types of chemicals reactions.

Ans: Types of Chemical reactions:

Chemical reactions can be divided commonly into five different types.

Decomposition reaction.

Addition reaction or combination reaction.

Single displacement reaction.

Double displacement reaction.

Combustion reaction.

1. Decomposition Reaction:

A reaction in which a chemical substance breaks down to form two or more simpler substances is known as decomposition reaction. These reactions require some energy for the decomposition of the substances. For example; calcium carbonate decomposes into calcium oxide and carbon dioxide in the presence of heat.

$Caco_3 \longrightarrow Cao + Co_2$

Similarly, potassium chlorate produces two simpler substances e.g. potassium chloride and oxygen gas on heating.

$2KCLO_3 \longrightarrow 2Kcl + 3O_2$

Addition reaction (Combination reaction):

A reaction in which two or more substances combine to form a single substance is known as an addition or combination reaction. These reactions are reverse of decomposition reaction. For example; calcium oxide (Cao) reacts with carbon dioxide (CO_2) to form calcium carbonate.

$CaO + CO_2 \longrightarrow CaCO_3$

Another example is, when sodium reacts with chlorine gas it gives new substances known as sodium chloride or common slat (NaCl).

2Na + Cl 2Nacl

Single displacement reaction:

A reaction in which one atom or group of atoms of a compound is replaced by another atom or group of atoms is known as single displacement reaction. Some metals react with acids, bases or even water to displace hydrogen (H_2) gas.

For example, zinc replaces hydrogen in hydrogen chloride (HCL) to give zinc chloride. When chlorine reacts with a solution of potassium bromide, chlorine replaces bromide to form KCL and Br_2.

$Cl_2 + 2KBr \longrightarrow 2Kcl + Br_2$

Double Displacement reaction:

It is a reaction in which two compounds exchange their partners, so that two new compounds are formed. In double displacement reaction usually there is an exchanged of ionic radical.

For example, when sodium chloride (NaCl) is reacted with silver nitrate ($AgNo_3$) solution, they exchange theirpartners to form two different compounds e.g. silver chloride (AgCL) and sodium nitrate. ($NaNo_3$).

$NaCl + AgNo_3 \longrightarrow NaNo_3 + AgCL$

Consider another example, when calcium chloride ($CaCl_2$) is reacted with sodium carbonate (Na_2CO_3) they exchange their partners to form two

new compounds, sodium chloride and calcium carbonate.

$CaCl_2 + Na_2CO_3 \longrightarrow 2NaCL + CaCO_3$

Combustion Reaction:

A reaction in which substances react with either free oxygen or oxygen of the air, with the rapid release of heat and flame is known as combustion reaction. For example, when methane (CH_4) gas burns in air, it forms carbon dioxide gas (CO_2) water (H_2O) and heat

Q.3: Describe the four different shapes of bacteria.

Ans: Shapes of Bacteria:

There are four shapes of Bacteria.

1. Cocci: (Singular – coccus = Greek Kokkos, Berry, Rounded etc.)

They are spherical and according to cell arrangement they are solitary (single), (Monococcus), in pair (Diplococci) in chain (Streptococci), in cluster (Staphylococci) etc. They are non-flagellated.

2. Bacilli: (Singular- Bacillus = Latin, Bakulus meaning rod)

They are rod shaped. They may be found in pairs (Diplobacillus) or in chain (Streptobacillus) etc. They may be flagellated.

3. Spirilla: (Singular- Spirillum = Greek, Sperira meaning coil)

They are spiral or cork screw shaped.

4. Vibrio or Comma:

They are slightly curved or comma (,) shaped e.g. vibrio cholera. They may be flagellated.

SOLVED MODEL PAPER FOR FINAL TERM

SUBJECT SCIENCE

Section: A (MCQ'S) Total Marks: 50 Marks 10

Exercise:

1. Measuring cylinder is used to find the _____ liquid.

   a. Volume b. Density c. molecules

Ans: Volume

2. _____ put forward his periodic law in 1869.

   a. Dobereiner b. Newland c. Mendeleev

Ans: Mendeleev

3. The _____ period contains two elements, hydrogen and helium.

   a. First b. Second c. Third

Ans: First

4. He gave laws of reflection.

   a. Ibn-Al-Haitham b. Al-Kindi

   c. Al Beruni

Ans: Ibn-Al-Haitham

5. _____ system is an old system.

   a. S.I b. CGS c. BE

Ans: CGS

6. One meter is equal to _____.

   a. 10^4mm b. 10^3mm c. 10^2mm

Ans: b. 10^3mm

7. The S.I unit if temperature us _____.

   a. Second b. Mole c. Kelvin

Ans: Kelvin

Section B

(Short Answer Questions)

Marks: 24

Note: Attempt any six questions.

Q.1: what is periodicity?

Ans: Periodicity:

The recurrence of chemical and physical properties of elements at regular interval in the periodic table is known as periodicity.

Q.2: What was the work of Lother Meyer?

Ans: Julius Lother Meyer, a German chemist and scientist, in December 1869 published a periodic table, in which the known 56 elements were arranged on the basis of their atomic masses in nine vertical columns of group from I to IX, but he laid down emphasis on the physical properties of elements.

He observed that the elements with similar properties of occupy similar position on the curve. For example, the highly reactive metals (Li, Na, K, Rb, Cs) occupy the peaks, there by showing that these elements are same in properties.

Q.3: Write down the name of 3 force that act form distance?

Ans: i. Gravitation force.
ii. Magnetic force.
iii. Elastic force

Q.4: What are laws of nature?

Ans: Laws of Nature:

Almighty Allah created this universe billions of years ago with a single word "be" and at once it come

into being. He inducted several principles and laws in it to sustain its function. Now from the day of their creation every particle of the universe is following these laws. These laws are known as laws of nature.

Q.5: Why do we use measuring cylinder?

Ans: We use measuring cylinder to measure the volume of the liquid.

Q.6: Write a short note on Dr. Abdul Kader Khan.

Ans: Dr. Abdul Qadeer Khan:

- He was born on 1st April, 1936 at Bhopal in India.
- He obtained M.Sc. Metallurgy degree from Holland. He was selected as research assistant in the same university.
- He obtained Ph.D. degree from the university of Leaven Belgium.
- He worked as an expert at Urenco Enrichment plant in Holland as a joint venture of the government of Holland.
- When Dr. Abdul Qadeer Khan imbued with the supreme spirit of patriotism, he returned to Pakistan to serve his motherland.
- He contributed in making Pakistan a nuclear state.
- He has been awarded Hilal-e-imtiaz by the government of Pakistan.

Q.7: What is system of units?

Ans: System of units:

A set of fundamental and derived units is known as system of units. There are three system of units being used in scientific work. For examples:

- MKS or (CGS) System
- British Engineering System
- The S.I System

Q.8: With what instrument can you find length, mass and time?

Ans: Ans: Instrument using for the measurement of length:

Meter scale, meter tape and ruler are used to measure the length.

Instrument using for the measurement of mass:

Physical balance and electronic balance are used to measure the mass.

Instrument using for the measurement of time:

Wall clock, wrist watch and stop watch are used to measure the time

Section C (Long Answer Questions)

Marks: 16

Note: Attempt any two questions.

Q.1: What do you understand by long from of periodic table? Explain.

Ans: Long form of Modern Periodic table:

The modern periodic table is the result of discovery of atomic number by Mosely in 1914. Based on the concept of atomic number, Werner and Bury proposed the modern periodic table.

The modern periodic table contains seven horizontal rows called periods and sixteen vertical columns called groups.

Periods:

The elements within a period have dissimilar properties from left to right.

First period:

It contains only two elements i.e. H and He. It is the shortest period with two elements.

Second and third periods:

Each of these periods contains 8 elements. The second period starts with Li and ends up with Ne, whereas the third period starts with Na and ends at Ar.

Fourth and fifth period:

Each of these periods contains 18 elements. The fourth starts form K and ends at Kr, whereas fifth period starts form Rb and ends at Xe.

Sixth period:

It contains 32 elements. It starts from Cs and ends with Rn. Besides, fourteen elements called lanthanides are placed at the bottom of the periodic table.

Seventh period:

It starts with francium (Fr). This period is incomplete as about 109 elements have been discovered. This period also includes a group of fourteen elements starting from Actinium (Ac). These elements are called actinides. They are also placed at the bottom of the periodic table.

Groups:

The vertical columns are called groups. Basically there are eight groups (I to VIII).

Group IA (The Alkali Metals) or (Lithium Family):

It includes Lithium (Li), Sodium (Na), Potassium (K), Rubidium (Rb), Cesium (Cs) and Francium (Fr).

Group IIA (Alkaline Earth Metals) or (Beryllium Family):

It includes Beryllium (Be), Magnesium (Mg), Calcium (Ca), Strontium (Sr), Barium (Ba) and Radium.

Group IIIA (Boron Family):

It includes Boron (Br), Aluminium (Al), Gallium (Ga), Indium (In) and Thallium (Tl).

Group IV A (Carbon Family):

It includes Carbon (C), Silicon, (Si), Germanium (Ge), Tin (Sn) and lead (Pb).

Group V A (Nitrogen Family):

It includes Nitrogen (N), Phosphorus (P), Arsenic (As), Antimony (Sb) and Bismuth (Bi).

Group VI A:

It includes Oxygen (O), Sulphur, Selenium (Se), Tellurium (Te) and Polonium (Po).

Group VII A (The Halogens):

It includes Fluorine (F), Chlorine (CL), Bromine (Br), Iodine (I) and Astatine (At).

Group VIII A (Inert or Noble Gases):

It includes Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe) and Radon (Rn).

Q.2: Write a detail note on the contribution of the Muslim scientist in the field of physics.

Ans: Contribution the Muslim scientists:

In Abbasid period Baghdad was a great centre of learning and knowledge. Scientists and intellectuals from all over the world came here to quench their thirst for knowledge. Caliph was a lover of knowledge and he encouraged learners and scholars for their remarkable achievements in the field of Physics. The contribution of some renowned scientists in the field of Physics is under as following.

Ibn-al-Haitham:

- Ibn-al-Haitham was a great scholar of Physics, mathematics, engineering, astronomy and medicine.
- He worked in optics.
- He gave the formal definition of ray of light.
- He discovered that nature of light and told that it is a kind of energy.
- He invented pin hole camera.
- He gave the laws of reflections.
- He wrote many books and Kitab-al-Manazir was a great milestone on optics.

Yakub Ibne Ishaq Alkindi:

- Yakub Ibne Ishaq Alkindi was born in Basra.
- He produced several research monographs on meteorology, specific gravity and on tides.
- He worked in the field of sound and optics.

- He explained the musical notes on scientific ground and discovered a method to express the notes in term of frequency.
- He also discussed the nature of sound.

Dr. Abdul Qadeer Khan:

- He was born on 1st April, 1936 at Bhopal in India.
- He obtained M.Sc. Metallurgy degree from Holland. He was selected as research assistant in the same university.
- He obtained Ph.D. degree from the university of Leaven Belgium.
- He worked as an expert at Urenco Enrichment plant in Holland as a joint venture of the government of Holland.
- When Dr. Abdul Qadeer Khan imbued with the supreme spirit of patriotism, he returned to Pakistan to serve his motherland.
- He contributed in making Pakistan a nuclear state.
- He has been awarded Hilal-e-imtiaz by the government of Pakistan.

Dr. Abdul Salam:

- He was born in Jhang, a small city in Pakistan in 192.
- He passed every examination with distinction.
- He was awarded scholarship for higher studies in U.K.
- He was awarded noble prize in Physics in 1979 for his work on grand unification theory (GUT).

- He established international centre for theoretical Physics at Trieste, Italy where scientist from the developing countries are provided opportunities to augment their research work.

Q.3: What is screw gauge? Describe its structure and working.

Ans: Definition of screw gauge:

It is an instrument used to measure the length or diameter up to 0.01mm.

Structure of screw gauge:

A micrometer screw gauge consists of a fine screw of usually 1 or 0.5 mm pitch, which moves when rotated through a nut, screw gauge has a linear scale, which is parallel to the axis of the screw and is known as the main scale and the circular scale which is divided into 100 or 50 divisions.

Working of the screw gauge:

Before using the screw gauge for making any measurement, find out its pitch, least count and zero error. Then place an object whose length or diameter is to be measured between its stud. Close the stud gently such that both the studs are in contact with the object. Then main scale and circular scale readings are taken. To take the circular reading, note the circular scale division which exactly. Multiply circular scale reading by its least count, it will be in centimeter, it is called fractional point. Now Add the main scale reading and the fractional part get total reading.