Subject English   **Class 9B/G/P**

Notes: (Unit 7-9)

Unit # 7   Sultan Ahmad Mosque

QUESTIONS:-

1. Why is the Sultan Ahmad Mosque also known as the Blue Mosque?

Ans. Sultan Ahmad Mosque is also known as Blue Mosque because of the blue tiles that embellish its interior.

2. Who was appointed as the architect of the mosque?

Ans. The royal architect Sedefhar Mehmat Aga was appointed as an architect of the mosque by Sultan and also in-charge of the project.

3. What was the purpose of hanging heavy iron chain hung at the entrance of the court?

Ans. A heavy iron chain was hung in the upper part of the court entrance on the western side. This side was meant for Sultan alone. The chain was put there so that the Sultan had to lower his head every time he entered the court. It was the symbolic gesture to ensure the humility of the ruler in the face of the divine.

4. How does the interior of the mosque look?

Ans. The interior of the mosque is embellished with blue tiles which gives its interior an attractive look.The lower level is designed with more than 20,000 hand made ceramic tiles in more than 50 different tulip designs.

5. Why do you think the Madrassah and the hospice were part of the mosque?

Ans. Madrassah was for the students who came to acquire Islamic knowledge and religious education and the hospice was for the needy people.As it was the custom the mosque was comprise of madrassah and hospice.

6. Who constructed mosque Sophia?

Ans. Hagia Sophia mosque was constructed by an Ottoman Caliph.

7. Who started the construction of Blue Mosque?

Ans. Ahmad I started the construction of the Blue Mosque in 1453 to 1923.

8. In whose reign the construction of the Blue Mosque was completed?

Ans. The construction of the Blue Mosque was completed in the reign of Mustafa I.

9. For what purpose does a heavy iron chain hang there?

Ans. A heavy iron chain hang there so that the Sultan had to lower his head every time he entered the court in order not to get hit and also as the symbolic gesture to ensure the humility of the ruler in the face of the divine.

10. Where is the royal room situated?

Ans. The royal room is situated at the south east corner of the Mosque.

Unit # 8 - Stopping By Woods On A Snowy Evening

Questions:-

1. Who is the speaker in the poem?

Ans. A horse rider is the speaker in the poem.

2. Whom does the speaker refer to in the first stanza of the poem?

Ans. The speaker refers to the owner of the woods.

3. Why does the speaker stop on "the darkest evening of the year"?

Ans. The speaker stops there to enjoy the beauty of nature and the darkest evening because the woods are lovely dark and deep.

4. Why does the horse impatiently await the next move of his master?

Ans. The horse thinks there is no farmhouse nearby he will be unable to get any food so he impatiently awaits for the next move of his master.

5. The speaker in the poem is captivated by the beauty of nature. Why doesn't he stop for long to enjoy nature's beauty?

Ans. He is captivated by the beauty of dark, deep and lovely woods but he has promises to keep.Therefore he could not stop anymore to enjoy the nature and its beauty.

Unit #9: All Is Not Lost

Questions:-

1. What is an ICU in a hospital?

Ans. An Intensive Care Unit (ICU) is a department in a hospital where those patients are treated who are critically ill. It provides intensive care and medicine to the patients.

2. To what extent does the recovery of a patient depend upon the doctor and the nurse?

Ans. The recovery of a patient depends upon the doctor and the nurse to a very large extent. A patient cannot recover without their treatment and proper care.

3. What do you infer about the professional skills from the expression, "Try once for her"?

Ans. She had a strong confidence on her that she could make the patient recover. She is a very kind, sincere, devoted, and caring nurse. She stuck to her opinion. Her expression "try once for her" speaks of her professional skills.

4. Identify kinds of noun used in the text.

Ans. Common Nouns, Proper Nouns, Material Nouns and Abstract Nouns have been used in the text.

5. Identify cognates in text.

Ans. Nurse, hospital, bus, eye, bed, person, patient, duty, head, leg, arm, machinery, battle.

6. Why did the nurse ask Hira's sister to come and talk to her?

Ans. The nurse asked Hira's sister to come and talk to her, thinking that the voice of a near and dear one might activate the nearly dead neurons.

7. Why did the nurse disagree with the doctor's point of view?

Ans. The nurse was not agreeing with the doctor's point of view because she thinks that it was an unwise decision to leave a patient unattended. Life is very precious; a chance should be given to a patient. She thought that her full attention could make her patient recover.

8. Why did the nurse ask herself the question: "Was it worthwhile to oppose and fight the decision of senior and more qualified surgeons"?

Ans. The patient was a hopeless case in the eyes of the surgeons and they wanted to get the bed cleared for the other patients. The nurse requested the senior doctors to let her stay in the I.C.U and allow her to attend to the patient. Her request was conceded to. She asked this question to reconsider her judgment about the patient.

9. Describe some qualities of the personality of the nurse in the story.

Ans. She was wise, devoted, sincere, honest, kind hearted, and ambitious. She had positive thinking and strong will power.

10. Why did the nurse say: "Where there is a will there is a way"?

Ans. She said so because she proved it practically that a hopeless patient could be cured if you are willing to fight a lost war. If there is no will there is no way. With strong will power a man can also accomplish impossible tasks.

Unit # 8 - Summary

Poem ; Stopping by woods on a Snowy Evening

Poet ; Robert Frost

Even in winter an isolated patch of snow has a specific quality

It is a very beautiful and symbolic poem written by a famous modern American poet "Robert Frost".Most of his poems deal with the theme of man's relationship with nature.This poem is considered as his masterpiece because this symbolic poem shows his love with nature and beauty and explains his philosophy of life

 As John Ruskin says,

Nature is a painting for us,day after day ,pictures of infinite beauty

On a dark winter evening the narrator stops his horse to watch the snow falling in the woods.He remembers that the owner of the woods lives in the town and does not know that a traveller stopped in his woods.So the traveller is free to enjoy the beauty of nature.

The horse is confused by his master's behaviour--stopping far away from any farmhouse --and shakes his harness bells in impatience.It was considered the darkest evening of the year in the deep forest.The sound which he could hear was of blowing winds and falling flakes of snow.

 William Wordsworth says that,

Nature never did betray the heart that loved her

The speaker desires to watch snow falling in woods while those woods belong to someone that person is not present and will not be able to see the traveller. The speaker emphasizes that he has no particular reason to stop but he he is stopping for the beauty of the scene only.However an element of darkness also appears which can indicate that all is not well.The scene of forest was very charming but the poet remembers his promises which he hasto fulfill.

Nature always wears the colour of the spirit.

The poet has yet to travel a long distance before he may go to sleep.Here "sleep" is the metaphor of death and he wanted to say that we are travellers in this world of fantasy.We should keep in mind our main aim of life and continue our struggle with patience and courage.

As it is said,

When you are balanced and when you listen and attend the need of your body,mind and spirit;your natural beauty comes out.

St. Mary's Convent High School

Class: 9   **Chemistry**

 ## Chapter no 5:
Physical states of matter.
Exercise short answer questions.
Q.1: What is diffusion?
Ans: The spontaneous movement of molecules from the region of higher concentration to region of lower concentration
Example: For example when a few drops of ink are added in a beaker of water, ink molecules move around and after a while spread in whole of the beaker.
Q.2: **Define standard atmospheric pressure. What are its units?**
Ans: It is pressure exerted by the atmosphere at the sea level. It is defined as pressure exerted by a mercury column of 760 mm height at sea level.

Q.3: Why are the densities of gases lower than that of liquids?
Ans: Densities of gases are 1000 times lesser than liquid because there are large empty spaces between the molecules of gases. Due to large volume and small mass, the density of gases is lower than liquid.
Q.4: What do you mean by evaporation? How it is affected by surface area?
Ans: The process of changing of a liquid into gas phase is called evaporation. It is a surface phenomenon. Due to large surface area more molecules are able to escape and liquid evaporates more quickly. So, greater the surface area, greater is evaporation.
Q.5: **Define the term allotropy with example?**
Ans: The existence of an element in more than one form in same physical state is called allotropy. For example allotropes of carbon are diamond, graphite and coal.
Q.6: In which form does sulphur exist at 100C?
Ans: Sulphur exists in mono clinic form at 100C.
Q.7: What is the relationship between evaporation and boiling point of a liquid?
Ans: A liquid having higher boiling point will have slow evaporation due to stronger intermolecular forces. While a liquid having low boiling point will have faster evaporation.

Chapter no 6:   Solutions.
Exercise short answer questions.

Q.1: Why does suspension and solutions not show Tyndall effect while colloids do?
Ans: Because particles of colloids are big enough to scatter the beam of light but there is no scattering of light by particles of solution because they are so small they cannot scatter the beam of light whereas particles of suspension are so big that light is blocked.
Q.2: What is the reason for the difference between solutions, colloid and suspension?
Ans: In solutions particles are very small. In colloids particles are larger than solution particles. In suspension particles are big enough to be seen with a naked eye and do not dissolve in water.
Q.3: Why does Suspension not form a homogenous mixture?
Ans: Particles in suspension remains undissolved and settle down after some time. Therefore suspension does not form a homogenous mixture.
Q.4: How will you test whether given solution is colloidal or not?
Ans: If a solution causes the scattering of light then the solution is colloidal solution while a solution showing no scattering of light the solution is not a colloidal solution.

Q.5: Why do we stir paints thoroughly before using?
Ans: Paint is a suspension. In suspension particles remain dissolved and settle down after some time. Due to this we stir paints thoroughly before using.
Q.6: What do you mean by like dissolve like? Explain with example.
Ans: Like dissolve like means polar substances are soluble in polar substances and non-polar substances are soluble in non-polar solvents. For example KCl and sugar are soluble in water and grease is soluble in ether.
Q.7: How does nature of attractive forces of solute-solute and solvent-solvent affect the solubility?
Ans: Solubility depends upon the attractive forces between solute-solute, solvent-solvent and solute-solvent. If new forces between solute and solvent particles overcome the solute-solute attractive forces, then solute dissolves. If forces between solute particles are stronger than solute-solvent forces, solute will be insoluble and solution is not formed.
Q.8: How can you explain the solute-solvent interaction to prepare NaCl solution?
Ans: When NaCl is added in water, it dissolves readily because the attractive interaction between ions of NaCl and polar molecules of water are strong enough to overcome attractive forces between Na^+ and Cl^- in solid NaCl. In this way NaCl dissolves in water.
Q.9: **Justify with example that solubility of a salt increases with increase in temperature?**
Ans: When a salt like KNO_3 is dissolved in water, heat is absorbed. It means heat is required to break the attractive force between ions of solute. Therefore solubility of such salt increases with the increase in temperature.
Q.10: **What do you mean by volume/volume %?**

Ans: It is the volume in cm of a solute dissolve per 100cm of the solution.

Chapter#5:

Multiple Choice Questions.

1. How many times liquids are denser than gases?
Ans: 1000 times.

2. Gases are the lightest form of matter and their densities are expressed in terms of :
Ans. gdm^{-3}

3. At freezing point which one of the following coexist in dynamic equilibrium:
Ans. Liquid and solid .

4. Solid particles posses which one of the following motions?
Ans. Vibrational motions.

5. Which one of the following is not amorphous?
Ans. Glucose.

6. One atmospheric pressure is equal to how many Pascals:
Ans. 101325.

7. In the evaporation process, liquid molecules which leave the surface of the liquid have:
Ans. Very high energy.

8. Which one of the following gas diffuses fastest?
Ans. Hydrogen.

9. Which one of the following does not affect the boiling point?
Ans. Initial temperatur of the liquid .

10. Density of gas increases, when its:
Ans. Pressure is increased .

11. The vapour pressure of a liquid increases with the:
Ans. Increase of temperature.

Chapter#6:

Multiple Choice Question :

1. Mist is an example of solution:
Ans. Liquid in gas.

2. Which one of the following is a 'liquid in solid' solution?
Ans. Butter.

3. Concentration is ratio of:
Ans. Solute to solution .

4. Which one of the following solutions contains more water?
Ans. 0.25 M

5. A 5% (w/w) sugar solution means that:
Ans. 5 g of sugar is dissolved in 95 g of water.

6. If the solute-solute forces are strong than those of solute-solvent forces. The solute:
Ans. Doesn't dissolve.

7. Which one of the following show negligible effects of temperature on its solubility?
Ans. NaCl

8. Which one of the following is a heterogeneous mixture?
Ans: Milk of magnesia

9. Tyndall effect is shown by:
Ans. Jelly.

10. Tyndall effect is due to:
Ans: Scattering of beam of light.

11. If $10cm^3$ of alcohol is dissolve in 100 g of water, it is called:
Ans. % v/w

12. When a saturated solution is diluted it turns into:
Ans: Unsaturated.

13. Molarity is the numbers of moles of solute dissolve in:
Ans: 1dm3 of solution.

Short Questions

Q.1 What is Anaphase?
Ans.
1 In this phase, the honmologous parts or the chromosomes are separated from each other.
2. The spindle fibres are contracted.
3. The chromosomes start to move towards the opposite poles.
4. Anaphase I is different from anaphase of mitosis because half of the number of chromosomes move towards each pole and each chromosome still has two chromatids.

Q.2. Define Apoptosis.
Ans. 1 Apoptosis is the main type of programmed cell death
2. 1t involves a series of biochemical events.
3. Between 50-70 billion cells die each day due to apoptosis in an adult human.

Q3. What is Benign?
Ans: Some time mutations occur in genes that control the timing and number of mitosis and the cells continue to divide. It results in growth of abnormal cells called tumors. As long as these tumors remain in their original location, they are called benign.

Q.4. What is Go Phase?
Ans. in multicellular eukaryotes, cels enter the Go phase from GI and stop dividing. Cells that have temporarily or permanentiy stopped dividing are said to have entered a state of quiescence, called GO phase. Some cells remain quiescence for long periods of time. e.g.
neurons. Some cells enter Go phase semi - permanently e.g., some cells of liver and kidneys.
Many cells do not enter Go and continue to divide throughout an organism's life. eg.epithelial cells.

Q.5. What is Budding?
Ans. Budding is the type of asexual reproduction in which an outgrowth is formed which is ultimately separated and grows in size c.g; yeast (Fungi)

Q.6. Define Crossing Over?
Ans. During meiosis prophase 1, the exchange of genetic material takes place between homologous chromosomes is called erossing over.

Q.7. What is G1 Phase?
Ans. (Cell cycle starts from G1)
1. Cell increases its supply or proteins
2. Increase the number of organelles (such that mitochondria, ribosomes)
3. Cell grows in size.

Q.8. What is G2 Phase?
Ans. In the G2 phase, the cell prepares proteins that are essential for mitosis, mainly for the spindle fibres.

Q.9. Define Homologous Chromosomes.
Ans. The chromosomes which are similar in morphology (size, structure centromere) Is known as homologous chromosomes.

Q.10. What is Interphase?
Ans. Interphase is the major phase of the cell cycle. It is the time when cell's metabolic activity is very high and it performs various functions. Typically interphase lasts for at least
90% of the total time required for cell cycle.
It is divided into three phases:

1. GI(First gap)
2. S phase (Synthesis)
3. G2(Second gap)

Q.11. Define Karyokinesis.
Ans. The division of nucleus is known as karyokinesis. The division of nucleus is further sub-divided into 4 phases.
1. Prophase
2. Metaphase
3. Anaphase
4. Telophase

Q.12. Define Mitosis?
Ans. The type of cell division in which two daughter cells are formed and number of chromosomes remain same as that of parents cells:

Q.13. What is Kinetochore?
Ans. structure that is the point where spindle fibres attach.

Q.14. What is M-Phase?
Ans. After the G2 phase of interphase, the cell enters the division phase i.e. M-Phase. It is characterized by mitosis, in which the cell divides into two daughter cells and the number of chromosomes remain same as that of parent cell.

Q.15. Define Malignant.
Ans. Some time mutations occur in genes that control the timing and number of mitosis and the cell continue to divide. It results in growth of abnormal cells called tumors. If these
tumors invade other tissues, they are called malignant (cancerous) tumors and their cells are called cancer cells.

Q.16. What is kinetochore?
chromosome has kinetochore at centromere. A kinetochore is a complex protein
When the spindlle grows to sufficient length, some of the spindle fibres, known as kinetochore fibres, begin searching for kinetochores to attach. A number of other fibres (non kinetochore) interact with the corresponding fibres from the opposite centrosome.

Q.17. What is Metaphase plate?
Ans. During metaphase, a kinetochore fibre attaches to kinetochore of the centromeres of the chromosomes arrange themselves along the equater of the cell forming a metaphase plate.

Q.18. What is Cell cycle?
Ans. The cell cycle is the series of events from the time a cell is produced until it completes mitosis and produces new cell. The cell cycle consists of two major phase.
1. Interphase
2. Mitotic phase

Q.19. What is Chiasmata?
Ans. Chiasmata is the region where crossing over occurs. It is a cross like links between two homologous chromosomes. After crossing over, homologous chromosomes separate from one another but remain tightly packed at chiasmata.

Q.20. Define Necrosis.
Ans. Necrosis is the name given to accidental death of cells and living tissue. There are many causes of necrosis such as:
 Infection

Injury

Necrosis is accompanied by special enzymes from lysosomes.

Cells that die from necrosis may also release harmful chemical that damage other cells.

Q. 21. Define prophase

Ans: Following changes takes place during prophase of mitotic division:
   I.   Condensation of chromatin
   II.   Duplication of chromosomes
   III.   Formation of mitotic spindle
   IV.   Disappearance of nucleolus
   V.   And nuclear envelope

Q.22. Define Phragmoplast.

Ans. During cytokinesis in plants, the vesicles derived from the Golgi apparatus move to the middle of the cell and fuse to form a membrane-bounded disc called the cell plate or phragmoplast.

Q.23. What is S-Phase:

Ans. In this phase, the cell duplicates its chromosomes. The DNA molecules of each chromosome is copied, and new protein molecules are attached.

Q.24. What are Sister chromatids?

Ans. The two chromatids of same chromosome are called sister chromatids. They are attached at same centromere.

Q.25. Define Spindle.

Ans, The two centrosomes give rise to microtubules present in the cytoplasm. The microtubules thus formed are called spindle fibres and the complete set of the spindle fibres is known as mitotic spindle.

Q.26. What is Synapsis?

Ans. During meiosis prophase 1, the lengthwise pairing of homologous chromosomes is called synapses
Or
The two non-sister chromatids of chromosomes become "zipped" together, forming
complexes known as chiasmata, in a process known as synapsis.

Q.27. Define Tubulin.

Ans. Tubulin is a type of protein present in the cytoplasm. The tubulin monomers give rise to microtubules by polymerization.

Q.28. What is Tumor?

Ans. Errors in the control of mitosis may cause cancer. All cells have genes that control the timing and number of mitosis. Sometimes mutations occur in such genes and cells continue
to divide. It results in growth of abnormal cells called tumors.

Q.29. Define Metastasis.

Ans. The tumors can send the cancer cells to the other parts in the body where new tumor may form. This phenomenon is called metastasis.

Q.30. What are different phases of mitosis?
Ans. Phases:
Mitosis two four phases:
1. karyokinesis 2. cytokinesis
Q.31. Define Cytokinesis?
Ans. Cytokinesis is the division of cytoplasm.

Q.32. How cytokinesis takes place in animal cells.

Ans.lt occurs by a process known as cleavage.
2. A cleavage furrow develops where the metaphase plate (a part of the cytoskeleton
3 The ring contracts deepening the furrow and eventually pinching the parent cell into two.

Q.33. How cytokinesis takes place in plant cell?
Ans.
1. In plant cells it occurs differently.
2. Vesicles derived from the Golgi apparatus move to the middle of the cell and fuse to form a membrane-bounded disc called the cell plate or phragmoplast.
3. The plate grows outward and more vesicle fuse with it. Finally the membranes of the cell
plate fuse with the plasma membrane and its contents join the parent celli wall.

Q.34. What is meiosis?
Ans. Meiosis is the process by which one diploid eukaryotic cell divides to generate four haploid daughter cells. Diploid means the cell in which chromosomes are in pairs
(homologous pairs) while haploid means the cells with half the number of chromosomes i.e.
chromosomes are not in the form of pairs.

Q.35. Define crossing over.
Ans. During meiosis prophase 1, the non-sister chromatids of homologous chromosomes
randomly exchange their segments and this phenomenon is called crossing over.

Q.36. Write Significance of Meiosis
Ans
1. Number of chromosomes remains constant in species to species.
2. Variations are produced.
3. Resistance power is produced due to meiosis.
4. Meiosis takes place in gamete formation and spore formation.
5. Each zygote will have a unique genetic make-up.

Chapter 7

Bioenergetics

Short Questions

Q.1. What is acetyl CO A?
Ans. Before entering in krebs cycle, pyruvic acid combines with coenzyme A and changed
into a 2- Carbon Compound called acetyl Co-A.

Q.2. What is Adenine?
Ans. It is a double-ringed nitrogenous base used in the molecular structure of ATP

Q.3. What is ADP?
Ans. ADP stands for Adenosine Diphosphate. When terminal bond of ATP is broken, a large amount of energy is released and ATP is converted into ADP. The breaking of one phosphate
bond releases about 7.3 kilo calories per mole of energy.
Adenosine- PO4- PO4- PO4 = ATP
Adenosine- PO4- PO4 ADP+Pi +7.3 K Cal mole

Q.4. Define Aerobic respiration.?
Ans. A type of respiration in which glucose is completely oxidized by free form of oxygen and as a result, 686000 calories per mole energy is released.

Q.5. What is Alcoholic fermentation?

Ans. In this type of anaerobic respiration, Pyruvic acid is further broken down into alcohol (CH,OH) and CO
Pyruvic Acid Ethyl alcohol +Carbon dioxide
2ATP molecules of energy are produced. It occurs in bacteria and yeast.

Q.6. What is AMP?
Ans. AMP stands for adenosine monophosphate. ADP is broken down to AMP and Pi is released.

Q.7. Define Anabolism.
Ans. There are certain constructive chemical reactions in which smaller molecules combine together to form complex structures which occur in our bodies. These are called anabolic reactions and the process is called anabolism e.g. photosynthesis and assimilation of food.

Q.8. Define Anaerobic respiration (Fermentation).
Ans. Some organisms oxidize their food incompletely without using any molecular oxygen called anaerobic respiration. It is of two types:
i) Lactic acid fermentation.
(i)Alcoholic fermentation.

Q.9.What is ATP?
Ans. ATP is abbreviation of adenosine tri-phosphate. It contains adenosine and three phosphates.
ATP is energy currency. It is a packet of energy produced in mitochondria by oxidation of glucose.

Q.10. What do you mean by the term Autotrophic?
Ans. The term autotrophic is applied to those organisms which can prepare their own food with the help of chlorophyll (photosynthesis) are called autotrophic
AMP +Pi + energy 7.3 (KCal / mole)

Q.11. Define bioenergetics.
Ans. Bioenergetics is the study of energy relationships and energy transformations (conversions) in living organisms.

Q.12. What is Calvin cyele?
Ans. Calvin cycle is also called dark reaction. Dark reaction is second phase of photosynthesis. it does not require light energy. In this reaction, glucose is synthesized in the absence of sunlight but energy required is obtained by NADPH and ATP formed during light reaction.

Q.13. What is Chlorophyl1?
Ans. Chlorophyll is a green pigment inside the chloroplasts of plant cells. It enables plants to capture solar radiations to convert them into chemical energy of glucose.

Q.14. Define Coenzyme -A.
Ans. The enzyme which combines with pyruvic acid to form acetyl COA before entering krebs cycle is called coenzyme A.

Q.15. Define Electron Transport Chain (ETC).
Ans. The final phase of cellular respiration in which the compounds NADH and FADH2 are oxidized and their electrons pass along a chain of oxidation reduction steps to produce ATP. This chain is called Electron Transport Chain.

Q.16. What is FAD?
Ans. Flavin adenine dinucleotide (FAD) is also a coenzyme like NAD". It gets 2 hydrogen and reduces to FADH2

Q.17. What is Glycolysis?
Ans. It is the first stage of aerobic respiration. In glycolysis, glucose is converted into Pyruvic acid. It occurs in cytoplasm and Oxygen is not involved in this stage.

Q.18. What is Krebs cyele?

Ans. It is the second stage of aerobic respiration. In krebs cycle, the Pyruvic acid molecules are completely oxidized into CO_2 and H_2O.

Q.19. What is Lactic acid Fermentation?

Ans. Introduction

It is a type of anaerobic respiration. Each Pyruvic acid molecule is converted into lactic acid (CHOs) Pyruvic acid Lactic acid

Occurrence

It occurs in skeletal muscles of humans and other animals during extreme physical activities when Oxygen cannot be transported to the cells as rapidly as it is needed. This also happens in the bacteria present in milk.

Q.20. Define light-dependent reactions.

Ans. Light dependent reaction (light reaction): During the first phase of Photosynthesis, light energy is captured and is used to make high energy molecules ic. ATP and NADP. It takes place in thylakoid membranes of chloroplast.

These reactioris take place in the stroma of the chloroplast.

Q.21. What are limiting factors?

Ans. Any environmental factor, the absence or deficiency of which can decrease the rate of a metabolic reaction is called limiting factor.

Q.22. What is Mesophyl1?

Ans. The inner tissues of a leaf whose cells are green because they contain chloroplast (chlorophyl) is called mesophyll. The process of photosynthesis occurs here.

Q.23. Define Metabolism.

Ans. The sum of all chemical processes (reaction) (Anabolism + Catabolism) taking place in living organisms is called metabolism.

Q.24. NADPH stands for what?

Ans. NAD (Nicotinamide adenine dinucleotide) is a co-enzyme that takes phosphate and hydrogen ions and is thus reduced to NADPH.

Q.25. Define Oxidation and Reduction reactions.

Ans. Oxidation: Addition of oxygen, removal of hydrogen or the loss of electrons is called oxidation. Oxidation is energy yielding process.

Reduction: Addition of hydrogen, removal of oxygen or the gain of electrons is called reduction. Reduction is energy consuming process

Q.26. Define photolysis.

Ans. (Photo: Light, lysis: breakdown) the breakdown of water molecules in the presence of light to release oxygen is called photolysis. Photolysis occurs in the light reaction (1" phase) of photosynthesis.

Q.27. Define photosynthesis.

Ans. Definition: The process by which plants and some other autotrophic organisms prepare their food (in the form of glucose) in the presence of sunlight and chlorophyll is called photosynthesis.

OR

"Photosynthesis is the synthesis of glucose from CO2 and water in the presence of sun light and chlorophyll with O, as a by-product."

OR

"In this process, the energy-poor inorganic oxidized compounds of carbon (i.e. CO) are reduced to energy rich carbohydrates (i.e. "glucose'")

Chemical Equation:

It is an anabolic process and nearly all life depends on it.

Q.28. What are photosystems?

Ans. Photosynthetic pigments are organized into clusters for efficient absorption and utilization of solar/light energy in thylakoid membranes. These clusters are called photosystems.

Q.29. What are Pigments?

Ans. Pigments are the coloured substances that absorb visible light. Different pigments

absorb light of different wavelengths. Chlorophyll a, chlorophyll b and carotenes are pigments effective for photosynthesis.

Q.30. What is pyruvie acid?
Ans. In the first step of respiration, a molecule of glucose (6-C) is broken down into two molecules of pyruvic acid. It is a 3-C Compound.

Q.31. What is respiration?
Ans. The breakdown of CH bond in the cell through oxidation reduction reaction is call respiration

Q.32. What is stroma?
Ans. Stroma: Chloroplast has a double membrane envelope that encloses dense fluid-filled region called stroma which contains most of the enzymes required to produce carbohydrate molecules.

Q.33. What is Thylakoid?
Ans. Another system of membranes is embedded in the stroma of chloroplast. These membranes form an interconnected set of flat, disc like sacs called thylakoids. Chlorophyll (and other photosynthetic pigments) are found embedded in the thylakoid membranes and give green colour to the plant.

Q.34. What do you mean by Z-scheme?
Ans. The path of electrons through the two photosystems during light reaction of photosynthesis is called Z-scheme due to its Z-shaped form.
OR
The whole series of light reactions is called Z-scheme due to its Z-shaped form.

Q.35. What is Light Independent Reaction (Dark Reaction)?
Ans. Light Independent Reaction: During the second phase of photosynthesis, CO% is reduced to make glucose. The energy in the light form of ATP is utilized and stored in the

bonds of glucose. Since these reactions do not use light directly, they are known as light independent reactions.

Q.36. What are redox reactions?
Ans. Oxidation reduction reactions (involve exchange of electrons Occur simultaneousley) are also called redox reactions

Q.37. Who discovered ATP and who proposed it as energy-transfer molecule in the living cell'?
Ans. Karl Lohmann discovered ATP in 1929 and Fritz Lipmann in 1941 proposed it as energy transfer molecule in living cell.

Q.38. Enlist the functions which are performed / carried out due to ATP?
Ans. Majority of the cellular functions are carried out due to ATP like the synthesis of macromolecules (DNA, RNA, Proteins), movement, transmission of nerve impulses, active transport, exocytosis and endocytosis etc.

Q.39. How much energy is released when one phosphate bond breaks in an ATP Molecule?
Ans. 7.3 kilo calories / mole or 7300 calories / mole of ATP is released when one phosphate bond breaks.

Q.40. What is the major energy currency in all living cells?
Ans. ATP i.e Adenosine Triphosphate is the major energy curency in all living cells.

Q.41. What are the conversion equations for ATP to AMP?
Ans. Following are the conversion equations for ATP to AMP:

Q.43. What are the raw materials for photosynthesis ?
Ans. CO and water are the raw materials for photosynthesis.

Q.44. Define Osmosis.
Ans. Osmosis is the movement of water molecules from a region of dilute solution to the region of concentrated solution through a selectively permeable membrane.

Example:
The movement of water molecules along with salts from the soil into the roots and root hairs takes place through osmosis.

Q45. How much the leaf surface is covered by stomata?
Ans. Stomata covers only 1-2% of the leaf surface.
Q46. What are the locations for the occurrence of light and dark reactions?
Ans. Light reactions takes place on the thylakoid membranes of the chloroplast.

Chap 8

Nutrition

Short Questions

Q.1. What is amylase
Ans. Saliva contains an enzyme salivary amylase, which aids in the partial digestion of starch.
Q.2. What is anemia?
Ans. The term anemia literally means "a lack of blood" The condition is caused when number of red blood cells are reduced to a level lower than the normal, caused by deficiency of iron.
Q.3. What is appendix?
Ans. From the blind end of caecum, there arises a non functional finger like projection called appendix. inflammation of appendix due to infection causes severe pain called appendicitis.
Q4. What is Assimilation?
Ans. Conversion and incorporation of absorbed simple food into the complex substances constituting the body is called assimilation.
Q.5. What is a balanced diet'?
Ans. A balanced diet may be defined as the one which contains the essential nutrients like carbohydrates, fats, proteins, minerals, vitamins in the correct proportion for the normal growth and development of the body.
Q.6. What is bolus?
Ans. After the processes of chewing, lubrication and partial digestion, the pieces of bread and mutton are rolled up by tongue into small, slippery, spherical mass called bolus.
Q.7. What is cardiac sphincter?
Ans. Stomach has two sphincters (openings which are guarded by muscles). The cardiac sphincter is between stomach and oesophagus. The bolus enters the stomach through it.
Q.8. What do you know about chyme?
Ans. In stomach, partially digested food is converted to a soup like mixture called chyme.
Q**.9. What do you know about colon?**
Ans. Large intestine has 5 parts, caecum, colon and rectum. Colon is the second part of it, from colon water is absorbed in to the blood.
Q.10. What is constipation?
Ans. Constipation: is a condition of hardening of the faeces due to excessive absorption of water through colon.
Q.11. What is Diarrhoea?
Ans. Diarrhoea: Diarrhoea is a condition when required water is not absorbed in the blood from the colon. A sufferer has frequent watery, loose bowel movements, This condition accompanied by abdominal pain, nausia and vomiting
Q.12. What are dietary fibres?
Ans. Dietary fiber (also known as roughage) is the part of the human food that is indigestible. It 1s found in plant foods and it moves undigested through the stomach and Small intestine and into the colon. It is of two types: a-soluble dietary fibre b-insoluble dietary fibre.
Q.13. Define Digestion?
Ans. The conversion of large and non diffusible molecules of food into smaller and diffusible molecules, by the action of enzymes is called digestion. It is of two types: a-chemical digestion b-mechanical digestion.

Q.14. What do you know about duodenum?
Ans. Duodenum comprises of the 10 inches (25 cm) of small intestine and it is the part of the alimentary canal where most of the digestive process occurs

Q.15. What is emulsification?
Ans. Bile, a secretion of liver has bile salts, which keeps lipid droplets separate from one another this process is called emulsification.

Q.16. Define epiglottis and glottis?
Ans. Glottis: It is the opening of the wind pipe or trachea and the Epiglottis is a flap of cartilage over the glottis, which close the glottis during swallowing of food through food pipe.

Q.17. What is Famine?
Ans. Famine is the lack of enough food to feed all the people living in an area. Famine may be due to unequal distribution of food, drought, flooding or increase in population.

Q.18. What are Fat - soluble vitamins?
Ans. The vitamins which are soluble in fats and are much less excreted from body are called fat soluble vitamins. e.g. Vitamins A, D, E and K are called fat- soluble vitamins.

Q.19. What are fertilizers?
Ans. During cultivation, humans have added certain materials to the soil, resulted in plants with desireable characteristics (e.g. more fruit, faster growth, better colour and more attractive flowers). Such materials are named as fertilizers. Fertilizers are classified as:
() Organic Fertilizers (i) In organic fertilizers

Q.20. Write composition of gastric juice. Where it is selected?
Ans. When food enters stomach, the gastric glands found in the stomach wall are stimulated to secrete gastric juice. It is composed chiefly of mucous, HCI and a protein digesting enzyme pepsinogen.

Q.21. What is gastrin?
Ans. Gastrin:- When protein in stomach is digested into peptides, these peptides stimulate the some cells of stomach wall secrete a hormone gastrin into the blood and distributed to all parts of the body including stomach. Here it has specific effects and stimulates the cells of gastric glands to secrete more gastric juice.

Q,22. What is Goiter?
Ans. lodine deficiency in diet causes enlargement of the thyroid gland.. Due to enlargement, t becomes prominent and produces from neck region. This disease is called goiter.

Q.23. What is ileum?
Ans. ileum: Last 3.5 m long part of small intestine is the ileum. It is concerned with the absorption of digested food from finger like structures called villi.

Q.24. Define inorganic fertilizers,
Ans. Inorganic fertilizers: Naturally occurring inorganic fertilizers are not chemically modified includes rock phosphate, elemental sulphur and gypsum. Most inorganic fertilizers dissolve in water so they efficiently supply the required nutrient for plant growth.

Q.25. What do you know about Intestinal juice?
Ans. Intestinal juice from the intestine walls contains many enzymes for the complete digestion of all kinds of food.

Q.26. What is Jejunum
Ans. Next to duodenum is 2.4 meters long is jejunum. It is concerned with rest of digestion of Proteins, starch and lipids.

Q.27. What is kwashiorkor?
Ans. Kwashiorkor: It is disease caused by protein deficiency at the age of about 12 months when breast feeding is discontinued. It can also develop at any time during a child's growing years. Children may grow to normal height but are abnormally thin.

Q.28. What s lacteal?
Ans. Lacteal: A vessel of lymphatic system which is prescnt in Tleum is called lacteal. Fatty acids and glycerol are absorbed in it. It opens in main lymphatic duct from where they enter in bloodstream.

Q.29. What is Lipase?
Ans. Lipase is an enzyme in pancreatic juice secreted by pancreas helps in the digestion of Lipids.

Q.30. What do you know about liver? Give its two functions.
Ans. A dark reddish organ, the liver is the largest gland of the body. It lies beneath the diaphragm on the right side of the abdomen. It consists of a larger right lobe and smaller left lobe. A pear shaped greenish yellow sac the gall bladder is present on its right lobe.
Functions:
() Deamination: Removal of amino groups from Amino acids.
(ii) Detoxification: Conversion of Ammonia into Urea.

Q.31. What is malnutrition? How you can compare it from starvation?
Ans. Malnutrition is a term for the condition caused by an improper or insufficient diet. Malnourished people cither do not take enough calories in their diet or are cating a diet that lacks proteins, vitamins or minerals.
Effects of malnutrition: It weakens the immune system, impairs physical and mental health, digested food from finger like structures called villi.
grow to normal height but are abnormally thin.

Q.32. What is marasmus?
Ans. In humans, protein energy malnutrition (PEM) leads to an in adequate availability of energy and protein in body which leads to diseases such as marasmus: Usually develops between the age of six months and one ycar in children. Patients lose all their body fat and muscle strength and acquire a skeletal appearance. Children with marasmus show poor growth and look small for their age.

Q.33. What is mineral deficiency?
Ans. Nutrient deficiency cause mineral deficiency means less availability of required minerals, The most common result of mineral deficiency is the poor growth and development in children.

Q.34. What do you know about nutrition?
Ans. The process in which food is obtained or prepared, absorbed and converted into body substances for growth and energy is called nutrition.

Q.35. What is Oesophagus?
Ans. A tube behind the pharynx is called oesophagus which connects the pharynx to the stomach. It does not contribute to digestion of food when passing through it.

Q.36. What is oral cavity?
Ans. Oral cavity is the space behind mouth, and has many important functions. Food selection is one of them. Mastication, Jubrication and chemical digestion of food are other functions.

Q.37. Define organic fertilizers.
Ans. Organic fertilizers: Derived from cither plants or animals' materials. Organic fertilizers are more complex chemical substances that take time to be broken down into forms usable by plants. They have fewer salts so their larger amounts can be applied without inury to plant roots.

Q.38. What do you know about over intake of Nutritients?
Ans. Over intake of nutrients (OlN), 18 a form of malnutrition in which more nutrients are taken than the amounts required for normal growth, developments and metabolism.
Effects of over intake of nutrients are usually intensificd when there is reduction in daily physical activity.

.39. What is Pancreas? What is its composition?
Ans. Pancreas is a leaf like organ Ilying below the stomach and between the two arms of the duodenum. Il produces a juice called pancreatic juice.

Q.40. What is pancreatic juice?
Ans. It contains enzymes trypsin, lipase and pancreatic amylasc, which digest protein, lipids and carbohydrates respectively. It is secreted by pancreas.

Q41. What is pepsin?

Ans. Pepsin: Pepsin is an enzyme present in gastric juice, which partially digests the protein portion of the food (bulk of mutton) into polypeptide and shorter peptide chains.

Q42. What is Pepsinogen?

Ans. A protein digesting enzyme is called pepsinogen. lt is secreted by gastric glands of stomach. It is converted into Pepsin by HCI.

Q.43. What is Peristalsis?

Ans. A rhythmic contraction of alimentary canal to push food down i.e. from mouth to stomach 1s called Peristalsis. if due to any reason direction of peristalsis reverses, vomiting

Q44. Where is Pharynx located?

Ans. The Pharynx is muscular passage way which extends from behind the nasal cavities to the opening of oesophagus and larynx.

Q45. What is Protein-energy malnutrition?

Ans. Protein-energy malnutrition refers to inadequate availability or absorption of encrgy and protein in the body. PEM may leads to diseases such as; kwashiorkor and marasmus

Q.46. What is Pyloric sphincter?

Ans. The opening which is guarded by muscles is pyloric sphincter and is present between stomach and small intestine.

Q47. What is rectum? Give its functions.

Ans. The last part of large intestine is called rectum.

Function: Faeces are temporarily stored in it which opens out through anus.

Q48. What is Saliva? Give its function?

Ans. The three pairs of salivary glands (under the tongue behind the jaws and in front of ears) release a juice called saliva in oral cavity. Saliva has two functions.

 Its adds water and mucous to the food which acts as lubricant.

it has an enzyme amylase, which aids in the partial digestion of starch.

Q.49. What is Starvation?

Ans. It is a severe reduction in nutrient and energy intake and is the most horrible effect of malnutrition.

Q.50. What is stomach

Ans. The stomach is a dilated part of the alimentary canal. It is J. shaped, located in the left of the abdomen just beneath the diaphragm. It is has two portions, the cardiac and the pyloric portion. Its walls have gastric glands which secretes gastric juice, which has HCI and pepsinogen, a protein digesting enzyme. In the stomach food is broken down and mixed with gastric juice by churning of it.

Q.51. What are trace minerals?

Ans. The minerals which are required by body in very small quantity less than 100 mg / day for functioning are called trace minerals i.e. Iron, Zinc, copper, chromium, flourine and lodine are trace minerals.

Q.52. What are villi?

Ans. Villi: In the folds of ileum, finger like structures are present, these projections are richly supplied with blood capillaries and helps in absorption of digested food. They also increase the surface area of inner walls of small intestine.

Q.53. What are laxatives?

Ans. The medicines called laxatives (e.g. parafin) are used for the treatment of constipation.

Q.54. What is swallowing?

Ans. Pushing of bolus to the back of mouth by tongue is called swallowing

Q.55. What is Trypsin?

Ans. Pancreas secretes pancreatic juice in which an enzyme trypsin is present which helps in the digestion of protein

Q.56. What are Vitamins?

Ans. Vitamins are the chemical compounds that arc required in low amounts but are essential for normal growth and metabolism. These are of two types

I-water soluble vitamins 2 Fat soluble vitamins

Q.57. What are water-soluble vitamins?
Ans. Vitamins B and C are known as water- soluble vitamins. These are soluble in water, so are excreaed from the body as compared to fat soluble vitamins which are much less excerated. So levels of water soluble vitamins in the body can decrease quickly leading to vitamin deficiency.

Physics   Exercise short questions
Chapter   7, 8, 9

Chapter#7
PROPERTIES OF MATTER
Short question related to exercise
Write short answers of the following questions:
7.1 How kinetic molecular model of matter is helpful in differentiating various states of matter?
Kinetic molecular model is used to explain three states of matter solid, liquid and gas.
Solid; In solids molecules are very close to one another, they posses greater attractive forces.
Liquids; Distance between molecules is greater as compared to solids.
Gases: In gases distance between molecules is too much.
7.2 What is meant by density? What is its SI unit?
Density: Density of a substance is defined as the mass per unit volume.
Formula: Density=Mass/Volume
d=m/v
Unit: The SI unit of density is kilogram per cubic metre (kgm-3).
7.3 Does there exist a fourth state of matter? What is that?
Yes, there exists a fourth state of matter that is called plasma.
At very high temperature, the matter assumes the state of ions and electrons this is called plasma.
7.4.Can we use a hydrometer to measure the density of milk?
Hydrometer is a device which is used to measure the density of fluid.as the hydrometer is a glass tube with a scale marked on its stem and heavy weight in the bottom. It is partially immersed in the milk that is also a fluid, the density of which is to be measured, hence we can use hydrometer to measure the density of milk.
7.5.Show that atmosphere exerts pressure.
Ans: Experiment: Boil an empty tin, half-filled with water, cap the tin. Let it col under tap water. The tin will get crumpled as the water cool down. As the steam condense, the pressure inside the metal tin decreases, the external atmospheric pressure that is higher, crushes the tin.
7.6 Define the term pressure.
Ans: Pressure: The force acting normally on unit area at the surface of a body is called pressure.
Formula
Pressure=Force/Area
P=F/A
Unit; In SI , the unit of pressure is Newton per square metre (Nm-2) or Pascal (Pa)
Physical quantity: It is a scalar quantity.
7.7It is easy to remove air from a balloon but it is very difficult to remove air from a glass bottle. Why?
Ans: It is very difficult to remove air from a glass bottle because air pressure in the bottle is less than atmospheric pressure but it is easy to remove air from a balloon due to lower external pressure.
7.8. Why water is not suitable to be used in a barometer?
Ans: Mercury is 13.6 time denser than water. Atmospheric pressure can hold vertical column of water about 13.6 times the height of mercury column at a place. Thus, at a sea level, vertical height of water column would be 0.76 X 13.6 = 10.4m. Thus, a glass tube more

than 10m long is required to make a water barometer.

7.9 What is barometer?
Ans: Barometer: The instrument that measures atmospheric pressure is called barometer. One of the simple barometer is mercury barometer.

7.10. What makes a sucker pressed on a smooth wall sticks to it?
Ans: Air pressure makes sucker pressed on a smooth wall stick to it.

7.11. What does it mean when the atmospheric pressure at a place fall suddenly?
Ans: A sudden fall ion atmospheric pressure often followed by a storm, rain and typhoon to occur in few hours time that cause internal energy of air decreases and coldness is produced.

7.12. Why does the atmospheric pressure vary with height?
Ans: Density of air is not uniform in the atmosphere. It decrease continuously as we go up. Hence atmospheric pressure is also decreased.

7.14. Explain the working of hydraulic press.
Ans: Hydraulic press works on the principle of Pascal's law and consists of two cylinders fitted with pistons of different cross sectional area.

7.15 State Pascal's law.
Ans: Pascal's law: Pressure applied at any point of a liquid enclosed in a container is transmitted without loss to all other parts of liquid.

7.16 What is meant by elasticity?
Ans: Elasticity: Elasticity is the property of matter by virtue of which matter resists any force Which tries to change its length , shape or volume

7.17. What is up thrust? Explain the principle of floatation.
Ans: **Up thrust**: The fluids (liquids) exert force in the upward direction when some object is immersed into them. This is called upward thrust.
Principle of floatation: The weight of fluid displaced is equal to weight of floating object inside liquid. Then object will into sink and keep floating. It is called principle of floatation.

7.18. State Archimedes principle:
Ans: Archimedes principle: When an object is whole or partially immersed in a liquid, an upthrust force acts on it equal to the weight of the liquid displaced. This is known as Archimedes principle.

7.19. Explain how a submarine moves up the water surface and down into water?
Ans:If the submarine is not filled with sea water then, its weight is less than upward thrust. So that is floats on surface of sea water. But when, it is filled with water. Then its weight becomes larger as compared with upward thrust of water then it sinks into water.

7.20. What is Hooke's law? What is meant by elastic limit?
Ans: **Hooke's law**: The strain produced in a body by the stress applied to it is directly proportional to the stress within the elastic limit of the body is called Hooke's law.
Stress ∞ Strain
Elastic limit; it can be define as a limit within which a body recovers its original length , volume or shape after the deforming force is removed.

7.13 changes are expected in weather the barometer reading shows a sudden increase?
Ans: If the barometer reading shows a sudden increase or a rapid increase in atmospheric pressure, means that it will soon be followed by a decrease in the atmospheric pressure indicating poor weather ahead.
limit:

7.21. Why does a piece of stone sink in water but a ship with a huge weight floats?
Ans: Ships and boats float on water. It is because the weight of an equal volume of water is greater than the weight of ships and boats. Ships have less density and large volume.
A stone sinks in water. It is because the weight of an equal volume of water is smaller

than the weight of stone, Stone has high density and small volume.

7.22. Take a rubber band. Construct a balance of your own using a rubber band. Check its accuracy by weighing various objects.
Ans: Take a rubber band, hang it with a hook. Then pointer is attached at the lower end of it with a scale in front of pointer. Different known weights are suspended. One by one, at lower end of this rubber band. The pointer position on the scale is marked for each different known weight suspended. It is called calibration of scale for weight measurement. This makes a balance for weight measurement.

Chapter # 8
Thermal properties of Matter
Short Questions
Write short answers of the following questions:
8.1Why does heat flow from hot body to cold body?
Ans:Heat flows from hot body to cold body to attain the condition of thermal equilibrium.

8.2.What is meant by internal energy of a body?
internal energy of a body: The sum of kinetic energy and potential energy associated with the atoms, molecules and particles of a body is called its internal energy.

8.3 Define the terms heat and temperature.
Heat: Heat is the form of energy that is transferred from one body to another in thermal contact with each other as a result of the difference of temperature between them.
Temperature: The temperature fa body is the degree of hotness or coldness of a body"

8.4.How does heating affect the motion of molecules of a gas?
By heating the gas, its molecules get high kinetic energy and start to collide more randomly and motion of gas molecules is increased by heating. So, pressure and volume of gas molecules increase by heating.

8.5Explain the volumetric thermal expansion
Volumetric thermal expansion; It is usually expressed as a fractional change in volume per unit temperature change.
$$V=V \circ (1+\beta \Delta T)$$

8.6 What is thermometer? Why mercury is preferred as thermometric substance?
Ans: Thermometer: A thermometer 1s a device which is used to measure the temperature of a body. Mercury is preferred as a thermometric substance due to following properties.
Mercury as thermometric substance:
- It is easily visible.
- It has uniform thermal expansion.
- it has low freezing point and high boiling point.
- it has a small specific heat capacity

8.7 Define specific heat. How would you find the specific heat of a solid?
Specific heat:"The specific heat of a substance is the amount of heat required to raise the temperature of 1kg mass of that substance through 1K .
Specific heat of any substance can be found out by using following formula:
$$C=\Delta Q/m\Delta T$$
C is the specific heat capacity.
ΔQ is the amount of heat absorbed by the body.
M is the mass of the body.
ΔT is the change of temperature.

8.8. Define latent heat of vaporization.

Ans: Latent heat of vaporization:"The quantity of heat that changes unit mass of a liquid completely into gas at its boiling point without any change in its temperature is called its latent heat of vaporization denoted by Hv".

Formula: $H_v = \Delta Q_v/m$

Unit: Jkg-1

8.9.Define and explain latent heat of fusion.

Ans: Latent heat of fusion :Latent heat of fusion is the amount of thermal energy, which must be absorbed for I mole of substance to change its state from solid to liquid without change in temperature, is called latent heat of fusion.

Unit: Its SI unit is Jkg-1

Formula : $H_f = \Delta Q_f/m$

8.10. What is meant by evaporation? On what factors the evaporation of a liquid depends? Explain how cooling is produced by evaporation.

Ans: Evaporation: Evaporation is escaping out of fast moving water molecules from the Surface of a liquid without heating.

F'actors:

- Temperature
- Surface area
- Wind
- Nature of liquid

Cooling by evaporation: During evaporation molecules having greater kinetic energ8y escape out from the surface of a liquid, while the molecules having lower kinetic energies are left behind. In this way evaporation produces cooling by lowering the average kinetic energy and the temperature of molecules of a liquid.

Chapter#9
Transfer of Heat
Short Questions
Write short answers of the following questions:

9.1. Why metals are good conductors of heat?

Metals are good conductors of heat because they possess the freely moving electrons.

9.2 Explain why?
(a) A metal feels colder to touch than wood kept in a cold place!
(b) Land breeze blows from land towards sea!
(c) Double walled glass vessel is used in thermos flask!
(d) Deserts soon get hot during the day and soon get cold after sunset!
Ans:

a. A metal feels colder to touch than wood because it is a good conductor due to free electrons. So it cools down more rapidly as compared to wood. Wood is an example of insulator.

b. At night, the land cools faster than the sea. Therefore, air above the sea is warmer, rises up and colder air from the land begins to move towards the sea.

C. Double walled glass vessel is used in thermos flask because double walled glass vessel has air between two glass walls that provide insulation.

d. Deserts soon get hot during the day and soon get cold after sunset because sand in the deserts has very low value of specific heat. It cools down and warms up fastly.

9.3 Why transfer of heat in fluids takes places by convection?

Transfer of heat in fluids takes place by convection because fluids are not good conductor

of heat. As, molecules of fluids are able to move freely, hence heat transfer takes place by convection.

9.4.Why conduction of heat does not take place in gases?
Conduction of heat does not take place in gases because gases are bad conductor of heat.

9.5.What measures do you suggest to conserve energy in houses?
Measures to Conserve energy
i. Hot water tanks are insulated by plastic or foam lagging.
ii. The bottoms of cooking pots are made black to increase the absorption of heat from fire
iii. Solar energy is used by solar panel in houses. The solar energy is converted into electric energy.
Iv. Switch off the electric appliance when these are not used by humans.
v. Energy n houses can be conserved by using energy savers instead of bulbs.

9.6.What is meant by convection current
Ans: Convection current: Hot air rises up creating gap which in filled by colder air, this air also gets warm and rises up. That is how, convection currents are produced.

9.7 How does heat reach us from the sun?
Heat reaches us from the sun through radiation process.

9.8 Suggest a simple activity to show convection of heat in gases not given in the book.
An example of convection in daily life is when we use a fire place of heat in our home, as the fire heats up the air in front of it, the hot air rises up as it is less dense and than in turn pushes the cool air down so that it is heated and then rises, this motion is called convection currents and in the reaction fire place air effective to heat us.

9.9. How various surfaces can be compared by a Leslie cube?
Ans: The rate at which various surface absorb heat is different from one another. So, on the basis of their ability to absorb heat through different surfaces can be compared by Leslie's cube.

9,10. Explain the impact of green house effect in global warming
Ans: During the recent years, the percentage of carbon dioxide has been increased considerably. This has caused an increase in the average temperature of the earth by trapping more heat due to greenhouse effect. This phenomenon is known as global warming This is serious implications for global climate.

9.11. What is greenhouse effect?
Ans: Greenhouse effect: Greenhouse effect is the result of infrared light not being able to transmit it back through the atmosphere into space after it has been radiated to the earth from the sun.

St. Mary's Convent Girls High School
Class: 9th   **Subject: Mathematics**
Unit no. 7
Linear equations and inequalities
Exercise 7.1
Q1. Solve the following equations.
   i) $\frac{2}{3}x - \frac{1}{2}x = x + \frac{1}{6}$

Taking L.C.M "6" and multiplying

$6 \times \frac{2}{3}x - 6 \times \frac{1}{2}x = 6 \times x + 6 \times \frac{1}{6}$

$4x - 3x = 6x + 1$

$4x - 3x - 6x = 1$

$4x - 9x = 1$

$-5x = 1$

$x = -\frac{1}{5}$

S. Set $= \left\{ -\frac{1}{5} \right\}$

ii) $\frac{x-3}{3} - \frac{x-2}{2} = \mathbf{-1}$

Taking L.C.M "6"

$6 \times \frac{x-3}{3} - 6 \times \frac{x-2}{2} = 6 \times -1$

$2(x-3) - 3(x-2) = -6$

$2x - 6 - 3x + 6 = -6$

$2x - 3x = -6$

$-x = -6$

$x = 6$

S. Set $= \{\mathbf{6}\}$

iii) $\frac{1}{2}\left(x - \frac{1}{6} \right) + \frac{2}{3} = \frac{5}{6} + \frac{1}{3}\left(\frac{1}{2} - 3x \right)$

$\frac{x}{2} - \frac{1}{12} + \frac{2}{3} = \frac{5}{6} + \frac{1}{6} - x$

` Taking L.C.M "12" and multiplying with each term

$12 \times \frac{x}{2} - 12 \times \frac{1}{12} + 12 \times \frac{2}{3} = 12 \times \frac{5}{6} + 12 \times \frac{1}{6} - 12 \times x$

$6x - 1 + 8 = 10 + 2 - 12x$

$6x + 12x = 10 + 2 + 1 - 8$

$18x = 5$

$x = \frac{5}{18}$

S. Set $= \left\{ \frac{5}{18} \right\}$

iv) $x + \frac{1}{3} = 2\left(x - \frac{2}{3} \right) - 6x$

$x + \frac{1}{3} = 2x - \frac{4}{3} - 6x$

Taking L.C.M "3" and multiplying

$3 \times x + 3 \times \frac{1}{3} = 3 \times 2x - 3 \times \frac{4}{3} - 3 \times 6x$

$3x + 1 = 6x - 4 - 18x$

$3x - 6x + 18x = -4 - 1$

$15x = -5$

$x = \frac{-5}{15}$

$x = -\frac{1}{3}$

S. Set $= \left\{ -\frac{1}{3} \right\}$

v) $\dfrac{5(x-3)}{6} - x = 1 - \dfrac{x}{9}$

$\dfrac{5x-15}{6} - x = 1 - \dfrac{x}{9}$

$18 \times \dfrac{5x-15}{6} - 18(x) = 18 \times 1 - 18 \times \dfrac{x}{9}$

$15x - 45 - 18x = 18 - 2x$

$15x - 18x + 2x = 18 + 45$

$-x = 63$

$x = -63$

    S. Set = $\{-63\}$

vi) $\dfrac{x}{3x-6} = 2 - \dfrac{2x}{x-2}$, $x \neq 2$

$\dfrac{x}{3x-6} + \dfrac{2x}{x-2} = 2$

$\dfrac{x}{3(x-2)} + \dfrac{2x}{x-2} = 2$

$3(x-2) \times \dfrac{x}{3(x-2)} + 3(x-2) \times \dfrac{2x}{x-2} = 2 \times 3(x-2)$

$x + 6x = 6(x-2)$

$x + 6x = 6x - 12$

$7x = 6x - 12$

$7x - 6x = -12$

$x = -12$

    S. Set = $\{-12\}$

vii) $\dfrac{2x}{2x+5} = \dfrac{2}{3} - \dfrac{5}{4x+10}$

$\dfrac{2x}{2x+5} + \dfrac{5}{4x+10} = \dfrac{2}{3}$

$\dfrac{2x}{2x+5} + \dfrac{5}{2(2x+5)} = \dfrac{2}{3}$

$\dfrac{2 \times 2x}{2x(2x+5)} + \dfrac{5}{2(2x+5)} = \dfrac{2}{3}$

$\dfrac{4x}{2(2x+5)} + \dfrac{5}{2(2x+5)} = \dfrac{2}{3}$

$\dfrac{4x+5}{2(2x+5)} = \dfrac{2}{3}$

$3(4x+5) = 2\big(2(2x+5)\big)$

$12x + 15 = 8x + 20$

$12x - 8x = 20 - 15$

$4x = 5$

$x = \dfrac{5}{4}$

    S. Set = $\left\{\dfrac{5}{4}\right\}$

viii) $\dfrac{2x}{x-1} + \dfrac{1}{3} = \dfrac{5}{6} + \dfrac{2}{x-1}$

$$\frac{2x}{x-1} - \frac{2}{x-1} = \frac{5}{6} - \frac{1}{3}$$

$$\frac{2x-2}{x-1} = \frac{5}{6} - \frac{1}{3} \times \frac{2}{2}$$

$$\frac{2x-2}{x-1} = \frac{5}{6} - \frac{2}{6}$$

$$\frac{2(x-1)}{x-1} = \frac{5-2}{6}$$

$$\frac{2(x-1)}{x-1} = \frac{3}{6}$$

$$2 = \frac{3}{6}$$

Not possible

ix) $\frac{2}{x^2-1} - \frac{1}{x+1} = \frac{1}{x+1}$

$$\frac{2}{(x+1)(x-1)} - \frac{1}{x+1} = \frac{1}{x+1}$$

$$(x+1)(x-1) \times \frac{2}{(x+1)(x-1)} - (x+1)(x-1) \times \frac{1}{x+1} = (x+1)(x-1) \times \frac{1}{x+1}$$

2-(x-1) = x-1

2-x+1 = x-1

3-x = x-1

3+1 = x + x

4 = 2x

$$\frac{4}{2} = x$$

$$x = 2$$

S. Set = {2}

x) $\frac{2}{3x+6} = \frac{1}{6} - \frac{1}{2x+4}$

$$\frac{2}{3x+6} + \frac{1}{2x+4} = \frac{1}{6}$$

$$\frac{2}{3(x+2)} + \frac{1}{2(x+2)} = \frac{1}{6}$$

$$\frac{2}{2}\left(\frac{2}{3(x+2)}\right) + \frac{3}{3}\left(\frac{1}{2(x+2)}\right) = \frac{1}{6}$$

$$\frac{4}{6(x+2)} + \frac{3}{6(x+2)} = \frac{1}{6}$$

$$\frac{7}{6(x+2)} = \frac{1}{6}$$

$$\frac{7}{(x+2)} = 1$$

7 = x + 2

7-2 = x

x = 5

S. set = {5}

Q2. Solve each equation and check for extraneous solution if any,

1) $\sqrt{3x+4} = 2$

Taking square on both sides

$(\sqrt{3x+4})^2 = 2^2$

3x +4 = 4

3x = 4-4

3x = 0

$x = 0$

Check:

Substituting $x = \mathbf{0}$ in original equation,

$\sqrt{3x + 4} = 2$

$\sqrt{3(0) + 4} = 2$

$\sqrt{0 + 4} = 2$

$\sqrt{4} = 2$

$\qquad 2 = 2$

$\qquad$ **S. Set = {0}**

2) $\sqrt[3]{2x - 4} - 2 = 0$

$\sqrt[3]{2x - 4} = 2$

Taking cube on both sides

$(\sqrt[3]{2x - 4})^3 = 2^3$

$2x - 4 = 8$

$2x = 8 + 4$

$2x = 12$

$x = \dfrac{12}{2}$

$x = 6$

Check:

Substituting $x = 6$ in original equation,

$\sqrt[3]{2x - 4} - 2 = 0$

$\sqrt[3]{2(6) - 4} - 2 = 0$

$\sqrt[3]{12 - 4} - 2 = 0$

$\sqrt[3]{8} - 2 = 0$

$2 - 2 = 0$

$0 = 0$

$\qquad$ **S. Set = {6}**

3) $\sqrt{x - 3} - 7 = 0$

$\sqrt{x - 3} = 7$

Squaring both sides

$(\sqrt{x - 3})^2 = 7^2$

$x - 3 = 49$

$x = 49 + 3$

$x = 52$

Check:

Substituting $x = 52$ in original equation

$\sqrt{x - 3} - 7 = 0$

$\sqrt{52 - 3} - 7 = 0$

$\sqrt{49} - 7 = 0$

$7 - 7 = 0$

$\qquad 0 = 0$

$\qquad$ **S. Set = {52}**

4) $2\sqrt{t + 4} = 5$

Squaring both sides

$(2\sqrt{t+4})^2 = 5^2$

$2^2 (\sqrt{t+4})^2 = 25$

$4(t+4) = 25$

$4t+16 = 25$

$4t = 25-16$

$4t = 9$

$t = \dfrac{9}{4}$

Check:

Substituting $t = \dfrac{9}{4}$ in given equation

$2\sqrt{t+4} = 5$

$2\sqrt{\dfrac{9}{4}+4} = 5$

$2\sqrt{\dfrac{9+16}{4}} = 5$

$2\sqrt{\dfrac{25}{4}} = 5$

$2 \times \dfrac{5}{2} = 5$

$5 = 5$

$$\textbf{S. Set} = \left\{\dfrac{9}{4}\right\}$$

5) $\sqrt[3]{2x+3} = \sqrt[3]{x-2}$

Taking cube on both sides

$(\sqrt[3]{2x+3})^3 = (\sqrt[3]{x-2})^3$

$2x+3 = x-2$

$2x-x = -2-3$

$x = -5$

Check:

Substituting $x = -5$ in given equation

$\sqrt[3]{2x+3} = \sqrt[3]{x-2}$

$\sqrt[3]{2(-5)+3} = \sqrt[3]{(-5)-2}$

$\sqrt[3]{-10+3} = \sqrt[3]{-7}$

$\sqrt[3]{-7} = \sqrt[3]{-7}$

$$\textbf{S. Set} = \{-5\}$$

6) $\sqrt[3]{2-t} = \sqrt[3]{2t-28}$

Taking cube on both sides

$(\sqrt[3]{2-t})^3 = (\sqrt[3]{2t-28})^3$

$2-t = 2t-28$

-t-2t = -28-2

-3t = -30

$t = \frac{30}{3}$

t = 10

Check:

Substituting t = 10 in given equation

$\sqrt[3]{2 - t} = \sqrt[3]{2t - 28}$
$\sqrt[3]{2 - 10} = \sqrt[3]{2(10) - 28}$
$\sqrt[3]{-8} = \sqrt[3]{20 - 28}$
$\sqrt[3]{-8} = \sqrt[3]{-8}$

S. Set = {10}

7) $\sqrt{2t + 6} - \sqrt{2t - 5}$

$\sqrt{2t + 6} = \sqrt{2t - 5}$
Squaring both sides
$(\sqrt{2t + 6})^2 = (\sqrt{2t - 5})^2$
2t+6 = 2t-5
2t-2t = -5-6
0 = -11
Not possible

8) $\sqrt{\frac{x+1}{2x+5}} = 2$

Squaring both sides

$(\sqrt{\frac{x+1}{2x+5}})^2 = 2^2$

$\frac{x+1}{2x+5} = 4$

$x + 1 = 4(2x+5)$
$x + 1 = 8x+20$
$x - 8x = 20-1$
$-7x = 19$
$x = -\frac{19}{7}$

Check:

Substituting $x = -\frac{19}{7}$ in given equation

$\sqrt{\frac{x+1}{2x+5}} = 2$

$\sqrt{\frac{-\frac{19}{7}+1}{2(-\frac{19}{7})+5}} = 2$

$$\sqrt{\dfrac{\frac{-19-7}{7}}{-\frac{38}{7}+5}} = 2$$

$$\sqrt{\dfrac{\frac{-12}{7}}{\frac{-38+35}{7}}} = 2$$

$$\sqrt{\dfrac{\frac{-12}{7}}{\frac{-3}{7}}} = 2$$

$$\sqrt{\dfrac{-12}{7} \times \dfrac{-7}{3}} = 2$$

$$\sqrt{4} = 2$$

$$2 = 2$$

S. Set $= \left\{-\dfrac{19}{7}\right\}$

Exercise 7.2

Q2. Solve for *x.*

i. $|3x - 5| = 4$

There are two situations

3*x*-5 =4	3*x*-5 =-4
3*x* =4+5	3*x* =-4+5
3*x* =9	3*x* =1
$x = \dfrac{9}{3}$	$x = \dfrac{1}{3}$
x =3	

S. Set $= \left\{3, \dfrac{1}{3}\right\}$

ii. $\dfrac{1}{2}|3x + 2|$ **-4 =11**

$\dfrac{1}{2}|3x + 2| = 11+4$

$\dfrac{1}{2}|3x + 2| = 15$

$|3x + 2| = 15 \times 2$

$|3x + 2| = 30$

There are two situations

3*x* +2 =30	3*x* +2 =-30
3*x* = 30-2	3*x* = -30-2
3*x* = 28	3*x* = -32
$x = \dfrac{28}{3}$	$x = \dfrac{-32}{3}$

S. Set $= \left\{\dfrac{28}{3}, \dfrac{-32}{3}\right\}$

iii. $|2x + 5| = 11$

There are two situations

2*x*+5 =11	2*x*+5 =-11
2*x* =11-5	2*x* =-11-5
2*x* =6	2*x* =-16

$$x = \frac{6}{2} \qquad , \qquad x = \frac{-16}{2}$$
$$x = 3 \qquad , \qquad x = -8$$

S. set $= \{3, -8\}$

iv. $|3 + 2x| = |6x - 7|$

There are two situations

3+2x =6x-7	, 3+2x =-(6x-7)
2x-6x =-7-3	, 3+2x =-6x+7
-4x =-10	, 2x+6x =7-3
$x = \frac{10}{4}$	, 8x =4
$x = \frac{5}{2}$	, $x = \frac{4}{8}$
	$x = \frac{1}{2}$

S. set $= \left\{\frac{5}{2}, \frac{1}{2}\right\}$

v. $|x + 2| -3 = 5- |x + 2|$

$|x + 2| + |x + 2| = 5+3$

$2\,|x + 2| = 8$

$|x + 2| = \frac{8}{2}$

$|x + 2| = 4$

There are two situations

x+2 = 4	, x+2 =-4
x =4-2	, x = -4-2
x =2	, x =-6

S. set $= \{2, -6\}$

vi. $\frac{1}{2}|x + 3| + 21 = 9$

$$\frac{1}{2}|x + 3| = 9 - 21$$

$\frac{1}{2}|x + 3| = -12$

$|x + 3| = -12 \times 2$

$|x + 3| = -24$

S. set $= \{\ \ \}$

vii. $\left|\frac{3-5x}{4}\right| - \frac{1}{3} = \frac{2}{3}$

$$\left|\frac{3 - 5x}{4}\right| = \frac{2}{3} + \frac{1}{3}$$
$$\left|\frac{3 - 5x}{4}\right| = \frac{2 + 1}{3}$$
$$\left|\frac{3 - 5x}{4}\right| = \frac{3}{3}$$

$\left|\frac{3-5x}{4}\right| = 1$

There are two situations

$\frac{3-5x}{4} = 1$	, $\frac{3-5x}{5} = -1$
$3 - 5x = 4$	, 3-5x=-4

$$-5x = 4 - 3 \quad , \quad 3+4=5x$$
$$-5x = 1 \quad , \quad 7=5x$$
$$x = \frac{1}{-5} \quad , \quad \frac{7}{5} = x$$
$$\textbf{S. set} = \left\{\frac{1}{-5}, \frac{7}{5}\right\}$$

viii. $\left|\dfrac{x+5}{2-x}\right|=6$

There are two situations

$$\frac{x+5}{2-x} = 6 \qquad\qquad , \qquad\qquad \frac{x+5}{2-x} = -6$$

$x+5 =6(2-x)$	$x+5 =-6(2-x)$
$x+5 =12-6x$	$x+5 =-12+6x$
$x+6x =12-5$	$x-6x =-12-5$
$7x =7$	$-5x =-17$
$x =\dfrac{7}{7}$	$x =\dfrac{17}{5}$

$$\textbf{S. set} = \left\{1, \frac{17}{5}\right\}$$

Exercise 7.3
Q1. Solve for the following inequalities.

i. **3x+1< 5x-4**

$3x-5x< -4-1$

$-2x< -5$

$(-1)(-2x) > (-1)(-5)$

$2x > 5$

$x > \dfrac{5}{2}$

$$\textbf{S. set} = \left\{x \middle| x > \frac{5}{2}\right\}$$

ii. **4x-10.3≤ 21x-1.8**

$4x-21x \le -1.8+10.3$

$-17x \le 8.5$

$(-1)(-17x) \ge (-1)(8.5)$

$17x \ge -8.5$

$x \ge \dfrac{-8.5}{17}$

$x \ge -0.5$

$$\textbf{S. set} = \{x|x \ge -0.5\}$$

iii. $4-\dfrac{1}{2}x \ge -7 + \dfrac{1}{4}x$

$4\times4 -4x\dfrac{1}{2}x \ge 4x - 7 + 4x\dfrac{1}{4}x$

$16-2x \ge -28+x$

$-2x-x \ge -28-16$

$-3x \ge -44$

$(-1)(-3x) \le (-1)(-44)$

$3x \le 44$

$x \le \dfrac{44}{3}$

$$\textbf{S. set} = \left\{x \middle| x \le \frac{44}{3}\right\}$$

iv. $x-2(5-2x) \geq 6x -3\frac{1}{2}$

$x -10+ 4x \geq 6x - \frac{7}{2}$

$5x-10 \geq 6x -\frac{7}{2}$

$2x \; 5x-2x \; 10 \geq 2x \; 6x - 2x \frac{7}{2}$

$10x-20 \geq 12x-7$

$10x-12x \geq -7+20$

$-2x \geq 13$

$(-1)\,(-2x) \leq (-1)\,(13)$

$2x \leq -13$

$x \leq \frac{-13}{2}$

$x \leq 6.5$

S. set $= \{x|x \leq 6.5\}$

v. $\frac{3x+2}{9} - \frac{2x+1}{3} > -1$

$9x \frac{3x+2}{9} - 9x \frac{2x+1}{3} > 9x - 1$

$3x+2-3(2x+1) \geq -9$

$3x+2-6x-3 \geq -9$

$-3x-1 \geq -9$

$-3x \geq -9+1$

$-3x \geq -8$

$(-1)\,(-3x) \leq (-1)\,(-8)$

$3x \leq 8$

$x \leq \frac{8}{3}$

S. set $= \left\{x\middle|x \leq \frac{8}{3}\right\}$

vi. $3(2x+1) -2(2x+5) < 5(3x-2)$

$6x+3-4x-10 < 15x-10$

$2x-7 < 15x-10$

$2x-15x < -10+7$

$-13x < -3$

$(-1)\,(-13x) > (-1)\,(-3)$

$13x > 3$

$x > \frac{3}{13}$

S. set $= \left\{x\middle|x > \frac{3}{13}\right\}$

vii. $3(x-1) - (x-2) > -2(x+4)$

$3x-3-x+2 > -2x -8$

$3x-x+2x > -8+3-2$

$2x+2x > -5-2$

$4x > -7$

$x > \frac{-7}{4}$

S. set $= \left\{x\middle|x > \frac{-7}{4}\right\}$

viii. $2\frac{2}{3}x + \frac{2}{3}(5x - 4) > -\frac{1}{3}(8x + 7)$

$$\frac{8}{3}x + \frac{2}{3}(5x - 4) > -\frac{1}{3}(8x + 7)$$

$$3x\frac{8}{3}x + 3x\frac{2}{3}(5x - 4) > 3x - \frac{1}{3}(8x + 7)$$

8x+2(5x-4) >-1(8x+7)

8x+10x-8 > -8x-7

18x+8 > -7+8

26x > 1

$x > \dfrac{1}{26}$

S. set $= \left\{x \middle| x > \dfrac{1}{26}\right\}$

Q2. Solve the following inequalities.

i. **-4 < 3x+5 < 8**

Representing into two separate inequalities

-4 < 3x+5   and   3x+5 < 8

-4-5 < 3x   3x < 8-5

-9 < 3x   3x < 3

$\dfrac{-9}{3} < x$ $x < \dfrac{3}{3}$

$-3 < x$ $x < 1$

-3 < x < 1

S. set $= \{x|-3 < x < 1\}$

ii. $-5 < \dfrac{4-3x}{2} < 1$

Representing into two separate inequalities

$-5 < \dfrac{4-3x}{2}$ and $\dfrac{4-3x}{2} < 1$

-10 < 4-3x   4-3x < 2

-10-4 < -3x   -3x < 2-4

-14 < -3x   -3x < -2

14 > 3x   3x > 2

$$\frac{14}{3} > x \qquad\qquad x > \frac{2}{3}$$

$$\frac{2}{3} < x < \frac{14}{3}$$

$$\textbf{S. set} = \left\{ x \middle| \frac{2}{3} < x < \frac{14}{3} \right\}$$

iii. $-6 < \frac{x-2}{4} < 6$

Representing into two separate inequalities

$-6 < \frac{x-2}{4}$ and $\frac{x-2}{4} < 6$

$-24 < x\text{-}2$ $\qquad\qquad$ $x\text{-}2 < 24$

$-24+2 < x$ $\qquad\qquad$ $x < 24+2$

$-22 < x$ $\qquad\qquad$ $x < 26$

$\qquad -22 < x < 26$

$\qquad\textbf{S. set} = \{x | -22 < x < 26\}$

iv. $3 \geq \frac{7-x}{2} \geq 1$

Representing into two separate inequalities

$3 \geq \frac{7-x}{2}$ and $\frac{7-x}{2} \geq 1$

$6 \geq 7\text{-}x$ $\qquad\qquad$ $7\text{-}x \geq 2$

$6\text{-}7 \geq \text{-}x$ $\qquad\qquad$ $\text{-}x \geq 2\text{-}7$

$-1 \geq \text{-}x$ $\qquad\qquad$ $\text{-}x \geq \text{-}5$

$1 \leq x$ $\qquad\qquad$ $x \leq 5$

$\qquad 1 \leq x \leq 5$

$\qquad\textbf{S. set} = \{x | 1 \leq x \leq 5\}$

v. $3x\text{-}10 \leq 5 < x+3$

Representing into two separate inequalities

$3x\text{-}10 \leq 5$ and $5 < x+3$

$3x \leq 5+10$ $\qquad\qquad$ $5\text{-}3 < x$

$3x \leq 15$ $\qquad\qquad$ $2 < x$

$x \leq \frac{15}{3}$

$x \leq 5$

$$2 < x \le 5$$

S. set = $\{x|2 < x \le 5\}$

vi. $\quad -3 \le \dfrac{x-4}{-5} < 4$

Representing into two separate inequalities

$-3 \le \dfrac{x-4}{-5}$ $\quad$ and $\quad$ $\dfrac{x-4}{-5} < 4$

$15 \le x-4$ $\qquad\qquad$ $x-4 < -20$

$15+4 \le x$ $\qquad\qquad$ $x < -20+4$

$19 \le x$ $\qquad\qquad\quad$ $x < -16$

$\qquad\qquad 19 \le x < -16$

$\qquad\qquad$ **S. set** = $\{x|19 \le x < -16\}$

vii. $\quad$ **1-2x < 5-x ≤ 25-6x**

Representing into two separate inequalities

$1-2x < 5-x$ $\quad$ and $\quad$ $5-x \le 25-6x$

$1-5 < -x+2x$ $\qquad\quad$ $-x +6x \le 25-5$

$-4 < x$ $\qquad\qquad\quad$ $5x \le 20$

$\qquad\qquad\qquad\qquad$ $x \le \dfrac{20}{5}$

$\qquad\qquad\qquad\qquad$ $x \le 4$

$\qquad\qquad -4 < x \le 4$

$\qquad\qquad$ **S. set** = $\{x|-4 < x \le 4\}$

viii. $\quad$ **3x-2 < 2x+1 < 4x+17**

Representing into two separate inequalities

$3x-2 < 2x+1$ $\quad$ and $\quad$ $2x+1 < 4x+17$

$-2-1 < 2x -3x$ $\qquad\qquad$ $2x-4x < 17-1$

$-3 < -x$ $\qquad\qquad\qquad$ $-2x < 16$

$3 > x$ $\qquad\qquad\qquad\quad$ $2x > -16$

$x < 3$ $\qquad\qquad\qquad\quad$ $x > -8$

$\qquad\qquad\qquad\qquad\qquad$ $-8 < x$

$\qquad\qquad -8 < x < 3$

$\qquad\qquad$ **S. set** = $\{x|-8 < x < 3\}$

Review Exercise 7

Q3. Short question.

i. **Define a linear inequality in one variable.**

Ans: Page 139

ii. **State the trichotomy and transitive properties of inequalities.**

Ans: Page 139

iii. **The formula relating degrees Fahrenheit to degrees Celsius is**

F = $\dfrac{9}{5}$ C + 32 . For what value of C is F< 0?

Ans: As **F<0**

$\qquad \dfrac{9}{5} C + 32 < 0$

$\qquad \dfrac{9}{5} C < -32$

$\qquad 9\, C < -32\text{x}5$

$$9\,C < \text{-}160$$
$$C < \frac{-160}{9}$$

iv. **Seven times the sum of an integer and 12 are at least 50 and at most 60. Write and solve the inequality that expresses this relationship.**

Ans: $50 < 7x+12 < 60$

Representing into two separate inequalities

$50 < 7x+12$	and	$7x +12 < 60$
$50\text{-}12 < 7x$		$7x < 60\text{-}12$
$38 < 7x$		$7x < 48$
$\frac{38}{7} < x$		$x < \frac{48}{7}$

$$\frac{38}{7} < x < \frac{48}{7}$$
$$\textbf{S. set} = \left\{x \middle| \frac{38}{7} < x < \frac{48}{7}\right\}$$

Q4. Solve:

i. $\sqrt{2t + 4} = \sqrt{t - 1}$

Squaring both sides
$$(\sqrt{2t + 4}\,)^2 = (\sqrt{t - 1}\,)^2$$
2t+4 = t-1
2t-t = -1-4
t = -5
Check:
Putting t= -5 in given equation
$$\sqrt{2t + 4} = \sqrt{t - 1}$$
$$\sqrt{2(-5) + 4} = \sqrt{-5 - 1}$$
$$\sqrt{-10 + 4} = \sqrt{-6}$$
$$\sqrt{-6} = \sqrt{-6}$$
$$\textbf{S. set} = \{-5\}$$

ii. $\sqrt{3x - 1} - 2\sqrt{8 - 2x} = 0$
$$\sqrt{3x - 1} = 2\sqrt{8 - 2x}$$

Squaring both sides
$$(\sqrt{3x - 1}\,)^2 = (2\sqrt{8 - 2x}\,)^2$$
3x-1 = 4 (8-2x)
3x-1 = 32-8x
3x+8x = 32+1
11x = 33
$$x = \frac{33}{11}$$
x = 3
Check:
Putting x=3 in given equation
$$\sqrt{3x - 1} - 2\sqrt{8 - 2x} = 0$$

$$\sqrt{3(3)-1} - 2\sqrt{8-2(3)} = 0$$
$$\sqrt{9-1} - 2\sqrt{8-6} = 0$$
$$\sqrt{8} - 2\sqrt{2} = 0$$

$2\sqrt{2} - 2\sqrt{2} = 0$

$$0 = 0$$

S. set = {3}

Q5. Solve:

i. **|3x + 14|-2=5x**

|3x + 14| =5x+2

3x+14 = 5x+2   and   3x+14 = -(5x+2)

3x+14 = 5x+2   ,   3x+14 = -5x-2

3x-5x = 2-14   ,   3x+5x = -2-14

-2x = -12   ,   8x = -16

$x = \dfrac{12}{2}$, $x = \dfrac{-16}{8}$

x = 6   ,   x = -2

S. set = {6 , −2}

ii. $\dfrac{1}{3}|x - 3| = \dfrac{1}{2}|x + 2|$

Multiplying with 6

$6\times \dfrac{1}{3}|x - 3| = 6\times \dfrac{1}{2}|x + 2|$

$2|x - 3| = 3|x + 2|$

$$\frac{|x - 3|}{|x + 2|} = \frac{3}{2}$$

$\dfrac{|x-3|}{|x+2|} = \dfrac{3}{2}$, $\dfrac{|x-3|}{|x+2|} = -\dfrac{3}{2}$

2(x-3) = 3(x+2)   ,   2(x-3) =- 3(x+2)

2x-6 = 3x+6   ,   2x-6 = -3x-6

2x-3x = 6+6   ,   2x+3x= -6+6

-x =12   ,   5x = 0

x =-12   ,   x = 0

S. set = {−12 , 0}

Q6. Solve the inequality.

i. $-\dfrac{1}{3}x + 5 \leq 1$

$-\dfrac{1}{3}x \leq 1\text{-}5$

$-\dfrac{1}{3}x \leq -4$

-x ≤ 3x-4

-x ≤ -12

x ≥ 12

S. set = {x|x ≥ 12}

ii. **-3 < $\dfrac{1-2x}{5}$ < 1**

5x-3 < 5x $\dfrac{1-2x}{5}$ < 5x 1

$-15 < 1-2x < 5$

$15 < 1-2x$ and $1-2x < 5$

$-15-1 < -2x$ $-2x < 5-1$

$-16 < -2x$ $-2x < 4$

$8 > x$ $2x > -4$

$x > -2$

S. set $= \{x | 8 > x > -2\}$