Subject: Science **Class: VII**

CHAPTER 1
Nutrition in Plants

SOLUTIONS

Page -6

Match The Following:

S. No.	Column I	Column II
1.	Chemical compounds present in food	Nutrient
2.	Organisms that can make their own food	Autotrophs
3.	Chemical used to test starch	Iodine solution
4.	Pigment present in chloroplast	Chlorophyll
5.	Ultimate source of energy on the earth	Sun
6.	Conducting tubes that transport prepared food within the plant	Phloem

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Sci. Quest

Q. Can you name some plants that are total root parasites?

Ans. Rafflesia, Balanophora, Orobanche

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Step by Step

A. State true or false for the following statements.

1. True
2. False: Heterotrophs derive their nutrition from living or dead organisms.
3. False: A saprophyte is an organism that derives its nutrition from dead and decaying organic matter.
4. True
5. False: Two mutually benefited partners in lichen are an alga and a fungus.

B. Give one example of each:

1. White button mushroom
2. Venus flytrap
3. *Cuscuta*
4. Fungus
5. Bread mould
6. Fungus

Sci. Quest

Page no- 10

Q. How do desert plants like cactus with reduced and spiny leaves make their food?

Ans. The desert plants like cactus have fleshly green stem which contains chlorophyll to prepare food through photosynthesis.

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Sci. Quest

Q. Does crop rotation help in replenishment of nutrients?

Ans. Yes, crop rotation helps in replenishment of nutrients *e.g.,* cultivating leguminous plants after a cereal crop helps to replenish nitrogen naturally in the soil.

Page 11-13 Exercise

Objective Questions

A. Select the correct option.

1. (b) : Phloem.
2. (d) : Moulds.
3. (a) : Fungus
4. (c) : Saprophytic nutrition
5. (d) : *Cuscuta* .

B. Fill in the blanks.

1. Cuscuta
2. Haustoria
3. Chloroplast
4. Autotrophs
5. Venus flytrap

C. Match the columns:

S.No.	Column I	Column II
1.	Mistletoe	Parasitic plants
2.	Stomata	Guard cells
3.	Manure	Mineral nutrition
4.	Xylem	Water transport
5.	Mushroom	Saprophyte

D. State true (T) or false (F) for the following statements:

1. True
2. False : An organism which derives its food from other living organism is called parasite.
3. False : Algae are autotrophic in nature.
4. True
5. False : The concentrations of carbon dioxide and oxygen in air are maintained by the process of respiration and photosynthesis.

E. Complete the given Analogy:

1 . Fungi
2. Mistletoe
3. Opening and closing of stomata
4. Penicillium

F. Write two examples for each of the following:

1. Mould, Mushroom
2. Algae, Green plants
3. Venus flytrap, Pitcher plant

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Subjective Questions:

Very Short Answer Type Questions:

Q1. Name two products of photosynthesis?

Ans. Glucose and oxygen

Q2. Name the conducting tissue which helps in transporting the food synthesized by green leaves to different parts of the plant.

Ans. Phloem is special conducting tubes that transport glucose (food) synthesized by leaves to different parts of the plant.

Q3. Name the mode of nutrition in which two different organisms live together for mutual benefits.

Ans. Symbiosis

Q4. Why are green plants called autotrophs?

Ans. Green plants are called autotrophs because they can make their own food.

Q5. What is chlorophyll?

Ans. Chlorophyll is a green pigment present in chloroplast. It is necessary for photosynthesis.

B. Short Answer Questions:

Q1. Differenentiate between xylem and phloem.

Ans. Xylem are the special water conducting tubes that transport water from roots to the leaves through stem, whereas phloem are the special food conducting tubes that transport glucose to storage organs of the plant.

Q2. Write any three ways by which fungi are useful to us.

Ans. i) Baker's yeast is used to make bread and other bakery products.
ii)Different species of fungi are used to make cheese.

iii)Fungi are used to produce antibiotic drugs, *e.g.*, *Penicillium*.

Q3. Plants cannot get nitrogen directly from atmosphere, How do they get nitrogen from protein synthesis.

Ans. Plants obtain nitrogen by the following two ways :

i) Fertilizers used by farmers in fields are enriched in nitrogen.

ii)Nitrogen is obtained by nitrogen fixing bacteria such as *Rhizobium*. These bacteria are present in soil and converts atmospheric free nitrogen into water soluble nitrogenous compounds that are then absorbed by plants.

Q4. Write the difference between total parasitic plant and partial parasitic plant. Give examples.

Ans. Total parasitic plants are totally dependent on the host plant for food, *e.g.*, *Cuscuta,* while partial parasitic plants can prepare their own food but depend on host plant for water and minerals.

Q5. Explain the role of Rhizobium in increasing soil fertility.

Ans. Rhizobium is a nitrogen-fixing bacteria that can convert free atmospheric nitrogen into nitrate, a soluble form of nitrogen that plants can use.

C. Long Answer Questions.

Q1.With the help of an activity show that carbon dioxide is needed for photosynthesis to take place.

Ans. To test the need of carbon dioxide for photosynthesis

Take two healthy potted plants of nearly the same size and keep them in a dark room for two days to destarch the leaves. Place both the plants on separate glass plates and cover them with bell jars.

Plant A **Plant B**

KOH Bell jar crystals in

Petri dish

Bell jar with KOH **Bell jar without KOH**

1. A watch-glass containing potassium hydroxide (KOH) is placed by the side of plant A.
2. Vaseline is used to seal the bottom of the jars with the glass plates so that the set-up can become airtight. Both plants are kept in sunlight for about 4-6 hours. Leaf from each plant is plucked and tested for the presence of starch by carrying out the iodine test.
3. The leaf that was taken from plant A does not turn blue-black. It shows the absence of starch. The leaf taken from plant B turns blue-black, showing the presence of starch in it. This is because KOH kept beside the plant A, absorbed all the CO_2 present in the air inside the bell jar. Hence, CO_2 is necessary for the process of photosynthesis.

Q2. What is photosynthesis? Explain the role of various raw materials required to perform photosynthesis.

Ans. The process by which plants make their own food in the presence of sunlight and chlorophyll using carbon dioxide and water from the environment is called photosynthesis.

The raw materials for photosynthesis:

i) Sunlight : It is the source of energy for chemical reactions that take place during the process of photosynthesis.

ii)Chlorophyll : It is the green pigment present in the chloroplast. The chlorophyll absorbs energy from sunlight and converts it into chemical energy which is stored in food.

iii)Water : Water along with soluble minerals is absorbed from the soil by the roots of plants. It is then transported by the stem to be reached to the leaves through special water conducting tubes called xylem.

iv)Carbon dioxide : Carbon dioxide diffuses from the air into the leaves through small pores known as stomata. Stomata are mostly present on the lower surface of leaves.

Q3. What are insectivorous plants? Explain how are the leaves of following plants get modified for trapping insects.

a) Pitcher Plant **b) Venus fly trap** **c) Sundew plant**

Ans. Insectivorous plants exhibit special mode of autotrophic as well as heterotrophic nutrition. They feed on animals, especially insects so they are called insectivorous plants.

The leaves of insectivorous plants are modified in various ways:

In pitcher plant: The hollow pitcher-like structure in a pitcher plant is a modified leaf. The apex of the leaf is modified into a lid. The inner side of pitcher is lined with downwardly pointed hairs. When the insect sits on the pitcher, the lid closes immediately and the insect gets trapped in the hair. The insect is drowned in the fluid present in the pitcher, where it is acted upon by the digestive juices.

Venus flytrap: The leaves of Venus flytrap have sharply pointed edges along their margins. The inner surface of the leaf has trigger hairs and is reddish in colour to attract insects. If an insect lands on the leaf, it touches these hairs and the leaves snap shut with speed. The pointed edges get interlocked and the insect is then digested.

The sundew plant has hundreds of tentacles spread all over the leaves. The tentacles produce shiny sticky substance which glitters like dew in sunlight. Once the insect sits on the leaf, it is enclosed within the tentacles and gets digested.

Q4. Define autotrophic and heterotrophic nutrition. Describe the four types of heterotrophic nutrition in plants with examples.

Ans. Autotrophic: The mode of nutrition by which organisms make food for themselves by using simple raw materials obtained from the environment is called autotrophic nutrition.

Heterotrophic : The mode of nutrition by which an organism depends on other organism whether living or dead for food is called heterotrophic nutrition.

Heterotrophic plants are of various types grouped under the following categories:

(i) Parasitic plants ii) Saprophytes (iii) Symbionts (iv) Insectivorous plants

i) Parasitic plants

An organism which derives its food from other living organism is called a parasite. The other living organism on which the parasite lives and depends for its nutrition is called host.

ii) Saprophytes

Organisms that derive their food from dead and decaying organic matter are called saprophytes or saprotrophs. For eg. Fungi

iii) Symbionts

Two organisms living together for mutual benefits are called symbionts. eg.Lichens.

iv)Insectivorous plants

Insectivorous plants feed on animals, especially insects so they are called insectivorous plants.eg. Venus fly trap, pitcher plant.

Q5. What will happened to life on the earth

a) in the absence of fungi **b) in the absence of photosynthesis?**

Ans. (a) In absence of fungi :

Fungi play an important role in the decomposition process by acting on dead remains of plants and animals. They help in releasing mineral nutrients from the organic compounds of plant and animal remains, thereby enhancing the soil fertility. So, in the absence of fungi, mineral recycling will get affected and soil fertility will be reduced.

(b) In absence of photosynthesis :

In absence of photosynthesis, plants and animals would not survive, as there would not be considerable amount of oxygen and food to support life on earth.

Page 13-14 Subject Enrichment

B. Practical Based Questions

Q. Rashmi's mother prepared pickle at home but after some days, Rashmi found small white cottony mass growing over the pickle. What are these structures and what could be the probable reason for this kind of growth?

Ans. A small white cottony mass growing over the pickle prepared by Rashmi's mother at home is mould. Moulds belong to the category of saprophytic fungi. They are also observed over a wide range of other things like jam, bread, etc. The reason for this kind of growth is the presence of moisture in the pickle. Air and moisture create condition that is necessary for mould growth on any food item and cause its spoilage.

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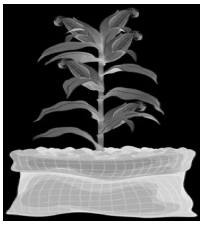
C. Diagram Based Questions.

Q. Identify the given plants and write down the mode of nutrition found in them.

Ans.

Maize/Autotrophic

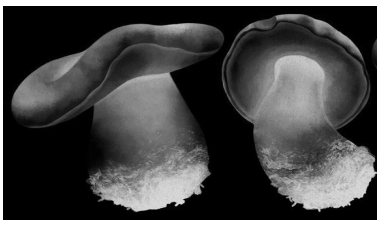


Cuscuta/Heterotrophic

Chickpea/Autotrophic

Pea /Autotrophic

Sunflower /Autotrophic



Mushroom /Saprophytic

D. Value Based Questions:

Aman is a farmer who uses excess of fertilizers in his field. Do you think excessive use of fertilizers has negative effect on environment? If yes, then suggest some ways by which Aman can increase fertility of his farmland without harming the environment.

Ans. Yes, an excess of fertilizer has a negative impact on the environment as it harms and the soil, making it either too acidic or too alkaline rendering it unsuitable for plant growth. Additionally, excess fertilizer can be washed away into water bodies, harming aquatic animals. Instead, Aman can use manures to enhance the soil fertility of the field, as manures do not cause soil and water pollution.

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HOTS Questions

Q1. Why do most leaves have thin, flat and broad surface?

Ans. Mostly leaves are green part of the plant. They are flat, thin and broad to maximize surface area for sunlight absorption as light energy can penetrate into leaves surface easily by chloroplast.

Q2. Plants do not have muscles like animals then why do they need protein?

Ans. Plants require proteins for their healthy growth and development. Proteins play a vital role in various processes, including photosynthesis, transportation, immunity, etc.

CHAPTER 2
Nutrition in Animals

SOLUTIONS

Page 16

Sci. Quest

Q. Do you know how starfish ingests its prey?

Ans. A starfish first holds its prey with arms and tube feet so that caught animal can't escape. After that, it extends its stomach out of its mouth to eat the animal inside the shell. Various digestive enzymes help to breakdown the food and digestion gets completed.

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Sci. Quest

Q. How is food prevented from entering the windpipe after swallowing?

Ans. Epiglottis prevents food from entering into the windpipe. It is a flap of tissue present in the pharynx.

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Step by Step

A. Fill in the blanks

1. Holozoic 2. Canines 3. Digestive juices 4. Digestive 5. Anus

B. State true or false for the following statements.

1. True
2. False : An adult human has 16 permanent teeth in each jaw.
3. False : Hydrochloric acid, present in stomach kills the germs in food.
4. False : Bile juice, secreted by the liver, helps in digestion of fats.
5. True

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Sci. Quest

Q. Why can't humans digest cellulose present in food?

Ans. Humans can't digest cellulose present in food because they don't have cellulose digesting enzyme (cellulase) which can breakdown cellulose.

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Step by Step

State true or false for the following statements:

1. False: Rumen is the first chamber in stomach of ruminants. Therefore, grass ingested is first sent to this chamber.
2. True
3. True
4. False : Cellulose is only partially digested in rumen.
5. False : Mode of nutrition in *Amoeba* is holozoic.

Page 24-25

Book Exercise

Objective Questions

A. Select the correct option.

1. (d) : Tentacles 2. (c) : Liver. 3. (b) : Emulsification. 4. (a) : Incisors 5. (b) : Small intestine

B. Fill in the blanks.

1. Amino acids 2. Small intestine 3. Omasum 4. Ptyalin 5. Villi

C. Match the columns.

S.No.	Column I	Column II
1.	Gall bladder	A sac-like structure attached to the liver
2.	Oesophagus	Peristalsis
3.	Pancreas	A leaf-like organ present below the stomach
4.	Stomach	Partial digestion of food
5.	Bile juice	Provides an alkaline medium in small intestine

D. State true(T)or false(F) for the following statements

1.False - *Amoeba* is a unicellular organism.

2.True

3.True

4.True

5.False -In ruminants, wall of abomasums secretes digestive juices to complete the digestion.

E. Complete the given analogy

1. Bile juice 2.Butterfly 3.Twelve 4.Hydra

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Subjective Questions

A. Very Short Questions

Q1. Define holozoic nutrition.

Ans. Animals can take the whole solid or liquid food. This mode of nutrition is called holozoic nutrition.

Q2.The stomach in ruminants has four chambers. Name them in sequence.

Ans. The stomach in ruminants has four chambers rumen, reticulum, omasum and abomasum.

Q3. Which part of the alimentary canal is the site for absorption of food?

Ans. Small intestine is the part of alimentary canal that is the site for absorption of food.

Q4. Define the term emulsification?

Ans. The process of breaking down of larger fat globules into smaller ones is called emulsification of fats.

Q5. Write the modes of ingestion in ants and butterflies.

Ans. Butterflies suck nectar from flowers with the help of proboscis. Ants chew their food.

B. Short Answer Type Questions

Q1. Explain the term peristalsis. Why is it advised not to talk or laugh while eating?

Ans. Wave-like alternate contraction and relaxation occurs in the muscular walls of oesophagus, due to which food is pushed downwards into the stomach. This type of movement occurs throughout the alimentary canal and is called peristalsis.

We are advised not to talk or laugh while eating because, if we talk or laugh wind pipe may open and the food we eat might enter to it rather than the food pipe. This can cause coughing or even choking.

Q2. Differentiate between absorption and assimilation.

Ans. Absorption : Digested food is absorbed in soluble form in the walls of small intestine. This process is called absorption.

Assimilation: Distribution of absorbed food to different part of body. This process is called assimilation.

Q3. What role does acid play in the stomach?

Ans. Hydrochloric acid kills bacteria that enter along the food and make the medium of the food acidic for stomach enzymes to act.

Q4. Describe the role of villi present in the inner walls of the small intestine.

Ans. Villi increase the surface area for rapid absorption of digested nutrients. Each villus is supplied with fine blood capillaries through which soluble food is absorbed into the blood.

Q5. How does tongue help in digestion? Write any three functions.

Ans. (a) Tongue helps in tasting the food.

(b) Tongue facilitates easy movement of food during mastication (Mixing of food with saliva).

(c) Tongue helps to swallow the food.

C. Long Answer Questions

Q1. Describe the different types of teeth in humans in terms of their structure, location, function and number in each jaw.

Ans. Different types of teeth in humans:

Name of teeth	Structure	Location	Function	No. in each jaw
Incisor	Chisel-shaped	Front of mouth	Biting/Cutting	4
Canine	Pointed and sharp	Either side of incisors	Piercing/Tearing	2
Premolar	Broad and flat surface	Behind canine on either side	Crushing/Grinding	4
Molar	Broad and flat surface; Larger than premolars	Behind premolars on each side	Chewing/Grinding	6

Q2. What are the five steps involved in holozoic nutrition? Define each of them.

Ans. **Different steps involved in holozoic nutrition are :**

i) Ingestion : The process of taking in food into the body is called ingestion. Different animals use different feeding organs and different of taking food into their body.

ii)Digestion : The process of breaking down of complex food into simple soluble substances is called digestion.

iii) Absorption : Digested food is absorbed in soluble form in the walls of small intestine. This process Is called absorption.

iv) Assimilation : Distribution of absorbed food to different part of body. This process is called assimilation.

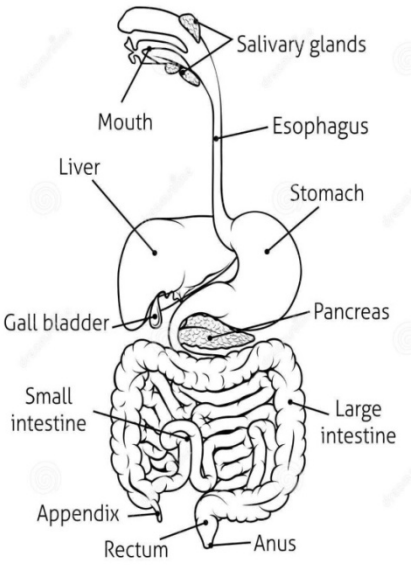
v) Egestion : The process of removal of undigested food waste from the body is called egestion.

Q3. How does the structure of stomach in ruminants differ from that of human beings? Describe the process of digestion in human beings.

Ans. Digestive system of human beings consists of a single stomach, whereas in ruminants stomach is a complex structure with four different compartments. Bacteria that help in digestion of cellulose are present in stomach of ruminants, while these bacteria are absent in stomach of human beings.

In human beings, process of digestion starts from the mouth.

Given figure describes the various parts of human digestive system and their functions.



Human digestive system

i) Buccal cavity (oral cavity): It helps in mechanical breakdown of food by chewing and mixing food with saliva to moisten and lubricates food.

ii) Pharynx: It is the common passage of food pipe and wind pipe which helps to swallowing of chewed food.

iii) Oesophagus:(Food pipe) it is the long ,muscular tube through which food passes from the throat to stomach

iv) Stomach: It is the widest part of digestive system. It helps in storage, and churning of food .It contains HCl which makes the medium acidic and kill germs. It contains a lining of mucus that protects it from HCl.

v) Liver: It is the largest gland in human body. It contains gall bladder which temporarily stores bile juice that helps in breakdown (emulsification) of fats.

vi) Pancreas : It is present below stomach .It helps in digestion of carbohydrates, protein and fats.

vii) Small intestine : Complete digestion of food takes place, absorbs nutrients, mostly water.

viii) Large intestine: Reabsorbs some water from faeces (undigested waste).

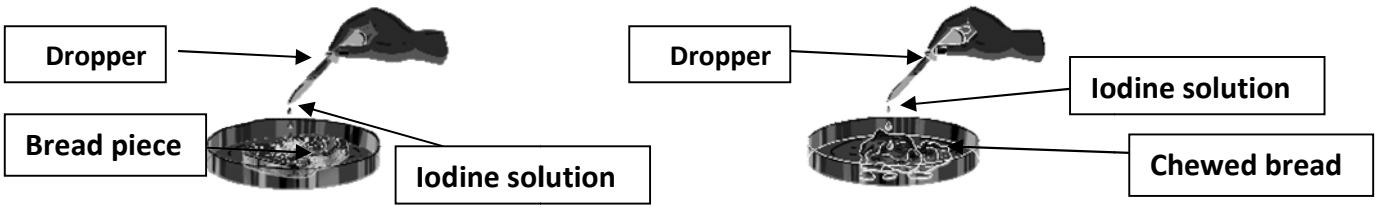
ix) Rectum: Stores and remove faeces.

x) Anus: Opening for elimination of faeces.

Q4.With the help of an activity prove that the saliva breaks down starch into sugars.

Ans. Take two Petri dishes A and B. In Petri dish A put a slice of bread and in Petri dish B put a chewed piece of bread. Now, add 2-3 drops of iodine solution over both the bread pieces drop by drop and note down your observation. You will observe that bread piece in Petri dish A turns blue-black whereas that in Petri dish B does not turn blue-black. This is because bread piece in Petri dish A contains starch and it reacts with iodine solution to give blue-black colour and in the bread piece of Petri dish B, the starch of bread is changed to sugar due to chewing and hence, it does not give blue-black colour with iodine.

Activity:



Petri dish A

Result: Bread piece turns into Blue-black in colour

Petri dish B

Result: No change in colour

Q-5 Explain the mode of nutrition in *Amoeba* with the help of diagram.

Ans: *Amoeba*, the single-celled, irregular shaped microorganism. Pseudopodia is finger like projections help in its movement and in capturing the food. It feeds on microscopic plants and animals present in pond water where it lives.

Digestion in *Amoeba* take place in following steps:

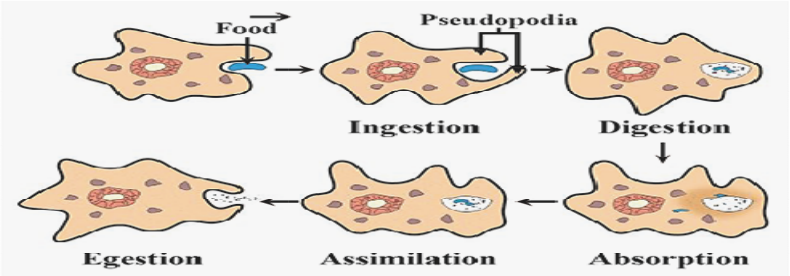
i) Ingestion: *Amoeba* engulfs (intake food in whole form) the food by projecting out pseudopodia, taking it inside the body to form a bubble- like food vacuole.

ii) Digestion: Digestive juices are secreted inside the food vacuole and food is broken into simpler substances to be absorbed into the cytoplasm by simple process of diffusion.

iii)Absorption : The absorbed substances are used for growth, maintenance and multiplication.

iv)Assimilation: The process in which digested food is distributed to different parts of body.

v) Egestion (excretion): Undigested food waste is removed from its body.



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Subject Enrichment

B. Practical Based Questions

Q. Lack of proper hygiene and having contaminated water and food lean to a condition called diarrhea. What preventive measures should one take to prevent diarrhea? What does ORS Stands for? How can you prepare it at home?

Ans. Preventive measures a person should take in order to prevent diarrhea are :

a) Drinking clean/distilled water.

b) Use of improved sanitation.

c) Regularly washing hands with soap and water.

d) Eating properly cooked food and avoid eating uncovered food. ORS stands for Oral Rehydration Solution. It can be prepared at home. It is made by mixing half teaspoon salt, six teaspoon sugar in one liter of distilled water.

C. Diagram Based Questions

Q. Identify the labeled parts X,Y and Z. Describe their roles in the digestion process.

Ans. In the given diagram X, Y and Z refer to liver, pancreas and gall bladder respectively.

X- Liver is the largest gland .It helps in digestion of fats .

Y- Pancreas is a leaf-like organ present below the stomach. It secretes pancreatic juice which helps in the further break down of carbohydrates, fats and proteins into simpler substance.

Z- Liver secretes bile juice that gets temporarily stored in a sac-like structure called gall bladder. Bile juice makes medium of small intestine alkaline and also causes emulsification (breakdown of fats) of fats.

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HOTS Questions:

Q1. A patient was diagnosed with gallstone which resulted in the complete blockage of his bile duct. What type of food should be recommended to this patient?

Ans. Bile helps in emulsification and digestion of fats. Therefore, if bile duct is blocked due to gallstone, such patients must take diet that is less in fats, as fat digestion would be affected.

Q2. Why do you instantly feel energetic while drinking Glucon – D?

Ans. Glucon-D contains glucose that helps in replenishment of body glucose and fill the body with energy, required to stay active. It is easily absorbed by the body thus giving out an instant energy and refreshment.

CHAPTER 3
Heat

SOLUTIONS

Page 29

Sci. Quest

Q. What is the normal temperature of a human body on Fahrenheit scale?

Ans. 98.6 degree Fahrenheit

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Fill in the blanks:

1. Temperature	2. Liquid	3. Clinical
4. 37℃	5. 35℃ 42℃	6. Kelvin (K)

Page 32

Sci. Quest

Q. How will you be able to hold a pan through its handle when it is too hot (when put on a flame) easily?

Ans. We are able to hold a pan through its handle if it is too hot easily because the handle is made up of plastic or wood, which acts as an insulator of heat.

Page 33

Sci. Quest

Q. Can you give other two examples where convection takes place?

Ans: a. Melting of ice

b. Boiling of water

c. Hot air balloon

d. air conditioning

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A. State true or false for the following statements:

1.True

2.True

3.False : Mercury is a liquid but it is a good conductor of heat.

4.True

5.False : Convection form of heat transfer takes place in liquids and gases only.

B. Write one word for each of the following :

1. Convection 2. Radiation 3. Conductors 4. Insulators

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Exercise

Objective Questions

A: Select the correct option:

1.(b) : Joule. 2.(d) : Both A & C. 3.(a) : Copper 4.(a) : Lighter than cold air.

5.(c) convection.

B. Fill in the blanks:

1. Bad 2. Expansion 3. Mercury 4. Metals 5. Solids

C. Match the column:

S.No.	Column I	Column II
1.	Average body temperature	37°C
2.	Hair and fur of animals	Bad conductors of heat
3.	Instrument to measure body temperature	Clinical thermometer
4.	Instrument to measure water temperature	Laboratory thermometer
5.	Sea breeze	Convection

D. State true or false for the following statements:

1. True
2. True
3. False : Land heats up faster during the day and phenomenon is called sea breeze since, cooler air from sea rushes towards land.
4. False : Heat always transfer in vertical upwards direction.
5. True

E. Write two examples of each of the following:

1. Copper, Mercury 2. Glass, Wood 3. Celsius, Kelvin Subjective Questions

A. Very Short Answer Questions

Q1. What is the primary mode of heat transfers in solids?

Ans. Solids show conduction form of heat transfer, primarily.

Q2. Why do we use a kink in a clinical thermometer?

Ans. Kink (bend) is also called constriction which prevents the mercury from falling back all by itself.

Q3. Why do we use an umbrella on a hot sunny day?

Ans. Umbrellas provide shade and the air flow in between act as heat insulator thus, protecting us from the Sun heat.

Q4. Write down the unit of heat.

Ans. Heat is a form of energy. Its unit is Joule (J).

Q5. State two conditions necessary for the conduction oh heat.

Ans. The two conditions are bodies must be solid and in contact with each other, there should be temperature difference between those two bodies.

B. Short Answer Questions

Q1. Why are digital thermometers preferred over mercury thermometer? Write any two precautions that must be followed while handling a thermometer.

Ans. Mercury is toxic in nature. If a thermometer breaks, it is difficult to dispose of mercury. So nowadays, mercury thermometers are being replaced by digital thermometer.

Precautions while using clinical thermometer:

1. Thermometers should be washed before and after use, preferably with an antiseptic solution.
2. Handle the thermometer with care. If it hits against some hard object, it can break.
3. Do not hold the thermometer by the bulb while reading it.

Q2. Why are car radiators painted black?

Ans. Car radiators are often painted black because black is a good heat absorber and emitter. This helps the radiator efficiently release heat generated by the engine, promoting effective cooling for the engine.

Q3. How do light-coloured clothes keep us cool during summers?

Ans. We feel more comfortable in wearing white and light-coloured clothes in summer. This is because light coloured clothes absorb a lesser amount of heat than dark-coloured clothes and therefore keep us cooler.

Q4. When we want to warm a liquid, we should warm it from below. Give reason for this.

Ans. When water is heated, the water near the flames gets hotter. Hot water rises up. The cold water from the sides moves down towards the source of the heat. This water also gets hot and rises and again the cold water from the sides moves down. This process continues till the whole water gets heated.

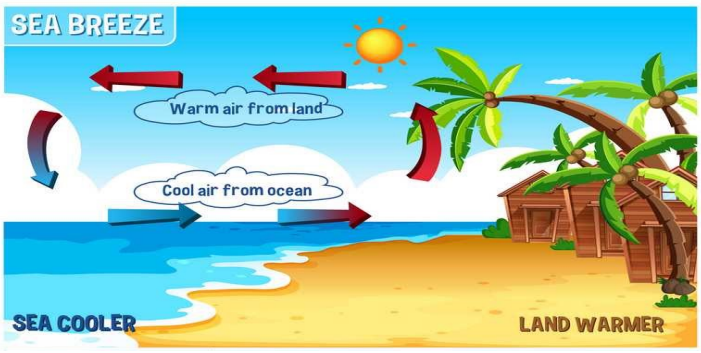
Q5. Why does the mercury column begin to fall as soon as it is taken out of a hot water in a laboratory thermometer?

Ans. Mercury expands on heating, so, when it is taken out of hot water, the mercury cools down and its expansion reduces. Therefore, mercury column begins to fall.

C. Long Answer Questions

Q1. Explain how land and sea breezes occurs due to convection, with the help of neat and clean diagram.

Ans. In coastal areas, sea breeze occurs during hot summer days because of the unequal heating rates of land and water. When land and sea absorb heat from the Sun during the day, the land surface heats up faster than the water surface. The air above the land becomes hotter and moves up, and cooler air from over the sea moves in to take its place. This is called a sea breeze.



At night, breeze direction is reversed. The air above the land cools faster than the air above the sea. As a result, the warmer air from the sea rises, and the cooler air from the land moves towards the sea. This is called a land breeze.

Q2. Differentiate between the following :

a) Heat and Temperature **b) Conductor and Insulator**

Ans. (a)

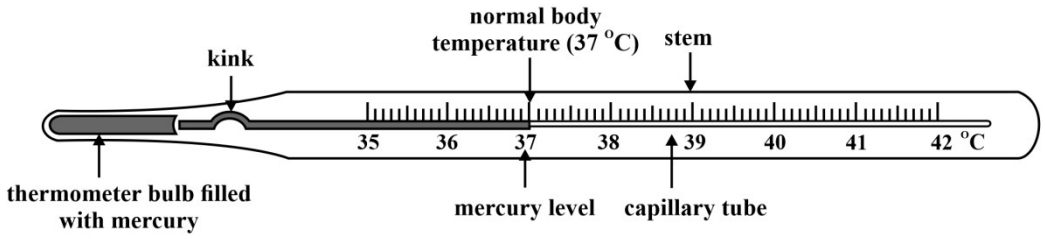
S. No.	Heat	Temperature
1.	It is a form of energy	It is a measure of degree of hotness or coldness of an object
2.	It is measured by calorimeter	It is measured by thermometer
3.	It is a cause	It is an effect
4.	Its SI unit is Joule (J)	Its SI unit is Kelvin (K)

(b)

S.No.	Conductor	Insulator
1.	Substances that conduct heat are called conductors.	Substances that do not conduct heat or poor conductor of heat are called insulators.
2.	Example metals: Gold, Silver, Copper	Example: Wood, Plastic, Glass

Q3. What is clinical thermometer? Explain its structure and working . Support your answer with neat diagram.

Ans. A clinical thermometer is a long, narrow and uniform tube of glass with a bulb at one end of the tube. This bulb contains mercury. Outside the bulb, a small shining thread of mercury can be seen in the thermometer tube. A temperature scale is marked on the glass tube of the clinical thermometer. It has a slight bend or kink in the stem just above the bulb, this kink is called the constriction which prevents the mercury from falling back all by itself. Thermometer works on the principle that heat energy causes expansion. The expansion of any substance upon heating depends on the material from which it is made and the amount of heat given to the substance. The extent of expansion is very less in solids and quite high in gases, therefore, expansion. Clinical thermometer of liquids is usually monitored to measure the temperature.



Q4. Differentiate between conduction, convection and radiation giving two examples of each.

Ans.

S No.	Conduction	Convection	Radiation
1	The process of transfer of heat from the hotter end to the colder end of an object without any material movement of the object is called conduction.	In liquids and gases, the molecules themselves carry energy from a hotter region to a colder region. This process of heat transfer is called convection.	Third mode of transferring heat which does not require a medium between hot and cold bodies. This mode of heat transfer is known as radiation.
2	For example, heating of a metal rod, heating of pan etc.	Boiling Water, Hot air balloon.	Microwave ovens, X-rays from an X-ray tube.

Q5. The windows of some houses in temperate countries which experience harsh winters are made of two layers of glass with a layer of air in between. What could be the probable reason for this? What kind of clothing is most suitable for people living in these countries and why?

Ans. The windows of some houses in temperate countries which experience harsh winters are made of two layers of glass with a layer of air in between to provide better insulation. The layer of air between the two glass panes acts as a thermal barrier, reducing heat transfer and helping to keep the interior warmer.
People in these countries often wear layered clothing to stay warm. This provides better insulation by trapping warm air between layers, helping to retain body heat in cold temperatures.

Page 39-40 Subjective Enrichment

B. Practical Based Questions

Q1. Two objects A and B are kept together. The temperature of objects A and B is 40^{o}C each. What will be the flow of energy between these two objects?

Ans. When the temperature of object is equal, then no transfer of heat takes place.
Since, object A and B are both at 40 C, therefore, no flow of energy would take place between them.

Q2. To get a hot breeze, when should you keep your sea – facing window open and why?

Ans. We should keep the window open at night to get hot breeze. During night, land loses heat faster than water and becomes cooler. The air over the sea is now warmer. It rises up and the cooler air over the land rushes to take its place and we observe land breeze at night. Due to this land breeze we will get hot air at night.

CHAPTER 4
Acids, Bases and Salts

SOLUTIONS

Page 46

A. Fill in the blanks:

1. Acetic acid
2. Concentrated nitric acid, concentrated hydrochloric acid
3. Sour
4. Formic acid
5. Acid, water

Page 52

Sci. Quest

Q. Why do we take weak alkalies and not strong alkalies to neutralize the excess acid in our stomach?

Ans. We take weak alkalies and not strong alkalies to neutralise the excess acid in stomach because strong alkalis can damage our stomach if too much of them are taken. Also, strong alkalies can easily upset the pH balance of our stomach.

Page 53

A. Match the column:

S.No.	Column I	Column II
1.	Acetic acid	Vinegar
2.	Magnesium Hydroxide	Antacid
3.	Sodium Hydroxide	Soaps and detergents
4.	Sulphuric acid	Car batteries
5.	Hydrocholoric acid	Sanitary ware cleaners

B. Give one word for the following statements:

1. Neutralisation
2. Salt
3. Calamine solution
4. Turmeric
5. Green

Page 54-56

Exercise

Objective Questions

A. Select the correct option:

1. (c) : Formic acid 2. (a) : magnesium hydroxide 3. (d) : All of these.
4. (a) : Pink. 5. (b) : 2

B. Fill in the blanks:

1. Red 2. Neutral 3. Seven 4. pH 5. Sodium carbonate

C. State True or False for the following statements:

1. False : Sodium hydrogen carbonate, also known as baking soda, is used for baking breads and cakes.
2. True
3. False: Shampoo will turn red litmus paper blue as it is alkaline in nature.
4. False: The dissolving of ammonia in water produces ammonium hydroxide solution, which is a weak base.
5. True

D. Complete the given analogy:

1. $CuSO_4 .5H_2O$ 2. Sulphuric acid
3. Sodium hydrogen carbonate 4. Ammonium hydroxide

E. Match the columns:

S.No.	Column I	Column II
1.	Curd	Lactic acid
2.	Baking soda	Sodium hydrogen carbonate
3.	Potash alum	Purification of water
4.	Blue Vitrol	$CuSO_4.5H_2O$
5.	Calamine lotion	$ZnCO_3$

Subjective Questions

A. Very short Answer Questions

Q1 What are neutral substances? Give an example.

Ans. Neutral substances are those substances which do not show any acidic or basic properties and do not change the colour of any litmus paper or indicator. *e.g.*, sodium chloride.

Q2. Define basicity with an example.

Ans. The number of replaceable hydrogen atoms present in an acid is a measure of its basicity. Carbonic acid contains two replaceable hydrogen atoms. Hence, its basicity is 2.

Q3. Write two properties of an acid.

Ans. (i) Acids taste sour. Due to the presence of acids, all citrus fruits (lemon, orange, grapes, etc.) taste sour.

(ii) Acids are highly corrosive in nature and therefore, should be handled with great care. They eat away cloth and paper.

Q4. What colour change do you observe on adding China rose indicator in a soup solution? Also, write its effect on hydrochloric acid.

Ans. China rose indicator turns green in a soap solution whereas it turns dark pink in hydrochloric acid.

Q5. What is the effect of dry litmus paper on solid baking soda?

Ans. The solid baking soda does not change the colour of dry litmus paper because in solid state, ions are not free to move. The solution of baking soda in water leads to change in the colour of dry litmus paper because in water, baking soda dissociates into ions and ions lead to change in the colour of litmus paper.

B. Short Answer Questions

Q1. How are salts formed? Define acidic, basic and neutral salts by giving an example of each.

Ans. Salt is formed during neutralisation reaction when an acid reacts with a base. It is a compound formed by replacing the hydrogen of an acid by a metal of a base.

Acidic salts are formed when a strong acid reacts with a weak base. They are produced by incomplete neutralisation of acids. *e.g.*, $NaHCO_3$.

Basic salts are formed when a strong base reacts with a weak acid. They are produced by incomplete neutralisation of bases. *e.g.*, Ca(OH)Cl, Mg(OH)Cl, etc.

Neutral salts are formed when a strong acid reacts with a strong base. Neutral salts are also called as normal salts. *e.g.*, NaCl, KCl, etc.

Q2. What is a neutralisation reaction? How is it important in our daily life? Write any two of its importance?

Ans. When an acid is mixed with a base, both neutralise each other and a new substance is formed, called salt, along with the evolution of water and heat. Such reaction is known as neutralisation reaction.

There are various applications of neutralisation reaction in our daily life, such as : Excess of hydrochloric acid (which digests food) in stomach leads to indigestion. To neutralize excess acid, we take antacids (contain weak alkalies) like milk of magnesia, to get relief from acidity. Before discharging in waterbodies, the factory wastes (which contain acids) must be neutralised by adding bases, such as slaked lime.

Q3. What is the effect of the following solutions on red and blue litmus papers? Tabulate the results.

a) Sugar Solution b) Washing Soda Solution c) Carbonated Drink

Ans.

S. No.	Substances	Effect on red litmus paper	Effect on blue litmus paper
(a)	Sugar solution	No effect	No effect
(b)	Washing soda solution	Turns blue	No effect
(c)	Carbonated drink	No effect	Turns red

Q4. What are natural and synthetic indicators? Give two examples of each. Also write their effects on acids and basics.

Ans. Natural indicators are those which can be obtained from plants. For example, turmeric, and China rose. Synthetic indicators are the ones which are synthesised in the laboratory. For example, phenolphthalein and methyl orange. Indicators indicate the presence of acid or base by changing their colour. Turmeric indicator shows no colour change in acidic solutions and turns red in basic solutions. China rose indicator turns magenta/dark pink in acidic solutions and green in basic solutions. Phenolphthalein remains colourless in acidic solutions and turns pink in basic solutions. Methyl orange turns red in acidic solutions and yellow in basic solutions.

Q5. Write any three differences between acids and bases. Give two examples of each.

Ans.

S.No.	Acids	Bases
1.	Acids are sour in taste	Bases have bitter taste
2.	Acids are highly corrosive in nature, and therefore should be handled with great care.	Bases are soapy to touch, and therefore feel slippery.
3.	Acid turns blue litmus red.	Bases turn red litmus blue.
4.	Example: hydrochloric acid, sulphuric acid	Example: calcium hydroxide, sodium carbonate

C. Long Answer Questions

Q1. What happens when acids and bases dissolve in water? How are they different depending on the extent of dissociation? Explain briefly.

Ans. On dissolving in water, acids dissociate to form positive ions and negative ions. They become electrolytes and begin to conduct electricity.

$$\mathbf{HCl + H_2O \longrightarrow H_3O^+ + Cl^-}$$

Hydrochloric Acid + Water ⟶ Hydronium ions + Chloride ions

All bases contain hydroxyl group. Alkalies are substances that produce hydroxyl (OH^-) ions in water.

$$NaOH \quad H_2O \longrightarrow Na^+ + OH^-$$

Sodium hydroxide Sodium ion Hydroxyl ion

The strength of an acid refers to its ability to lose a proton (H^+ ion). A strong acid is the one that completely ionises in a solution, forming hydronium ion. Examples of strong acids are hydrochloric acid, nitric acid and sulphuric acid.

The strength of a base refers to its ability to lose a hydroxyl ion. A strong base is the one that completely ionises in a solution. Examples of strong bases are sodium hydroxide and potassium hydroxide.

Q2. Write the effects of the following indicators on lime water and vinegar. Tabulate the results.

a) Red Litmus paper b) Phenolpthalein c) Turmeric d) Red cabbage e) Blue Litmus paper

Ans.

S. No	Indicator	Lime water	Vinegar
(a)	Red litmus paper	Blue	No change
(b)	Phenolphthalein	Pink	Colourless
(c)	Turmeric	Red	No change
(d)	Red cabbage	Green	Red
(e)	Blue litmus paper	No change	Red

Q3. Demonstrate the experiment to carry out the neutralization reaction of hydrochloric acid with sodium hydroxide solution. Which indicator do you choose for performing the experiment.

Ans. (a) Take 10 mL of hydrochloric acid in a conical flask and add few drops of phenolphthalein indicator into it. It remains colourless as phenolphthalein remains colourless in acidic solutions.

(b) Now add sodium hydroxide solution dropwise to this solution.

(c) You will observe the appearance of pink colour with addition of each drop, as NaOH is basic in nature.

(d) Continue adding NaOH drops until the solution becomes hot and the formation of salt and water occurs.

Q4. Define acidity of a base. Give one example each of monoacidic, diacidic and triacidic bases.

Ans. The number of replaceable hydroxyl groups present in an alkali is a measure of its acidity. An alkali may be monoacidic, diacidic or triacidic.

For example, NaOH is a monoacidic base as it contains one replaceable hydroxyl (OH) group, calcium hydroxide [Ca(OH)] is a diacidic base as it consists of two replaceable hydroxyl groups and ferric hydroxide [$Fe(OH)_2$] is a triacidic base as it consists of three replaceable hydroxyl groups.

Q5. Write any three uses of each of the following:

a) Sulphuric acid b) Slaked Lime c) Caustic Soda

Ans. (a) Sulphuric acid is used in storage batteries, in the manufacturing of paints, synthetic clothes, detergents, drugs, dyes, plastics, paper, fertilizers.

(b) Calcium hydroxide, commonly known as slaked lime, is used to neutralise soil acidity and in wastewater treatment.

(c) Sodium hydroxide, commonly known as caustic soda, is used in the manufacturing of paper, textiles, soaps and detergents.

Page 56-57

Subject Enrichment

B. Practical Based Questions

Q1. What makes carbonated drinks fizzy? Explain briefly. What colour change these drinks give with methyl orange indicator?

Ans. Carbonated drinks get fizzy due the presence of carbon dioxide (CO_2) in them. These drinks give red colour with methyl orange indicator.

Q2. Why does a turmeric stain becomes red on applying detergent to it?

Ans. Turmeric is a natural indicator that turns red in basic solutions. Detergent is basic in nature, hence a turmeric stain becomes red on applying detergent to it.

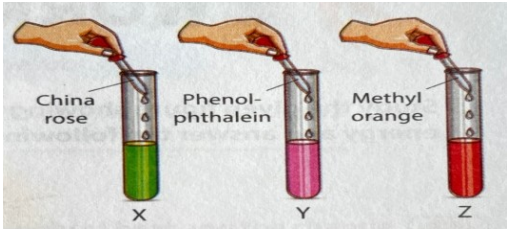
C. Diagram Based Questions

Q. Three solutions X , Y and Z are tested with different indicators as shown in the following figures. Answer the following questions:

a) Label the solutions X, Y and Z as acidic , basic or neutral solution.

b) If hydrochloric acid is added to the solution Y , what colour change do you observe?

c) Write the range of pH for solutions X , Y and Z.



Ans. (a) Solution X is basic as China rose indicator turns green in basic solutions. Solution Y is basic as phenolphthalein turns pink in basic solutions. Solution Z is acidic as methyl orange turns red in acidic solutions.

(b) If hydrochloric acid is added to the solution Y, the pink colour of the solution becomes colourless.

(c) Range of pH for solution X = 8 to 14

Range of pH for solution Y = 9 to 13

Range of pH for solution Z = 2 to 6

D. Value Based Questions:

Q. Ridhi is staying near a manufacturing industry which produces pesticides. The waste is released untreated into water bodies. Ridhi reported this issue to local authorities starting the harmful effects of untreated waste on plants, animals and human beings. Do you think Ridhi is right on her part? What preventive measures should such industries take to avoid harmful impacts on the environment?

Ans. Yes, Ridhi is right to report the issue. Industries should implement proper waste treatment processes to avoid harmful impacts on the environment. Preventive measures include adopting eco-friendly production methods, treating industrial waste before disposal, and adhering to environmental regulations. Additionally, implementing sustainable practices and promoting transparency can contribute to minimizing the negative effects on plants, animals and human health.

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HOTS Questions

Q1. What is acid rain? How does it affect us? What can we do to prevent acid rain?

Ans. Acid rain is a form of precipitation with high levels of sulphuric and nitric acids. Air pollutants such as sulphur dioxide (SO_2) and nitrogen oxides (NO_2) *X* react with water, oxygen and other substances to form sulphuric and nitric acids.

Effects: It is harmful for all living beings and monuments.

Acid rain can be prevented by following ways :

Filter and detoxify the water released by the factories before returning it to the rivers.

Reduce the emission of pollutant gases by industries.

Encourage the production and use of renewable energy instead of fossil fuels.

Q2. You have studied that hydrochloric acid is strong acid. Why does it not burn our stomach and intestine?

Ans. Hydrochloric acid breaks down the food and absorbs essential nutrients, and it also helps to control viruses and bacteria that might otherwise infect the stomach. A mucus membrane covers the wall of our stomach which prevents the action of HCl and ensures that the stomach wall itself is not damaged by the hydrochloric acid. Hence, hydrochloric acid is unable to burn our stomach and intestine.

CHAPTER 8
Reproduction in Plants

SOLUTIONS

Page 116

Sci. Quest

Q. Can you name some more plants which propagate vegetatively by leaves?

Ans. Peperomia, Kolanchoe, African violet , Bryophyllum, Begonia, hoya

Page 118

Sci. Quest

Q. Name few more algae that reproduce through fragmentation.

Ans. Ulothrix and Oedogonium, spirogyra, oscillatoria

A. Fill in the blanks:

1. Clone 2. *Hydra* 3. Stem 4. Fruit trees 5. Eyes

B. Circle the odd one out:

1. *Dahlia:* It propagates vegetatively by root, whereas the other two propagate vegetatively by stem.

2. Begonia : It propagates vegetatively by leaf, whereas the other two propagate vegetatively by stem.

3. Sweet potato: It propagates vegetatively by root, whereas the other two propagate vegetatively by stem.

4. Bryophyllum: It propagates vegetatively by leaves, whereas the other two propagate vegetatively through stem.

5. Dahlia: It propagates vegetatively by root, whereas the other two propagate vegetatively by stem.

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Sci. Quest

Q. Do bats also help in pollination?

Ans. Yes, bats also help in pollination. The pollination of plants by bats is called chiropterophily.

Page 125

A. Match the columns:

S.No.	Column I	Column II
1.	Wind-pollinated plant	Maize
2.	Water-pollinated plant	*Zostera*
3.	Insect-pollinated plant	*Salvia*
4.	Seeds dispersed by the wind	Drumstick
5.	Seeds dispersed by the water	Lotus
6.	Seeds dispersed by the animals	Urena

B. State True of False for the following statements:

1. True 2. True 3. True

4. False : Self fertilisation does not lead to genetic variation. Cross pollination bring variation.

5. False : Maize, papaya and cucumber have unisexual flowers.

Page 127-129 Exercise

Objective Questions

A. Select the correct option:

1. (b) : wheat, maize and rice.
2. (c) : Male gamete is produced in anthers.
3. (a) : S and P.
4. (c) : Spirogyra.
5. (b) : vines.

B. Fill in the blanks:

1. Spore formation 2. Small and light 3. Anther 4. *Dahlia* 5. Insects

C. Match the coloumns:

S.No.	Column I	Column II
1.	Unisexual flower	Papaya
2.	Bisexual flower	Mustard
3.	Budding	*Hydra*
4.	Bulb	Garlic
5.	Spore formation	Ferns

D. Sate True or False for the following statements:

1. True
2. True
3. False : Avocado is a single-seeded fruit.
4. True
5. False : Water pollinated flowers are small, inconspicuous, nectarless and odourless.

E. Complete the given analogy:

1. *Asparagus* 2. *Bryophyllum* 3. Orchid 4. Coconut 5. Budding

F. Circle the odd one out:

1. Sugarcane: Sugarcane reproduces by natural method of vegetative propagation, whereas the other three reproduce by artificial methods of vegetative propagation.

2. Spirogyra : Spirogyra reproduces by fragmentation, whereas others reproduce by spore formation.

3. Sunflower: Sunflower is pollinated by insects, whereas wheat, rice and maize are pollinated by wind.

4. Dandelions : Seeds are dispersed by wind in dandelion, whereas in the other three seeds are dispersed by animals.

Subjective Questions

A. Very Short Answer Questions

Q1. Define fertlisation.

Ans. The process of fusion of a male and female gametes to form a zygote is called fertilisation.

Q2. What is a bud?

Ans. A bulb-like projection that arises over the parent organism and eventually breaks off and develops into an independent organism is called bud.

Q3. Which structure are enclosed by seed?

Ans. Seeds are the reproductive propagules of plants that contain the embryo and food for developing new plants.

Q4. Name various agencies of fruit and seed dispersal.

Ans. Wind, water and animals help in dispersal of seeds and fruits.

Q5. Name the different parts of a flower.

Ans. Different parts of a bisexual flower are sepals, petals, stamen, pistil and stalk.

B. Short Answer Questions

Q1. What is pollination? Differentiate between self pollination and cross pollination.

Ans. The process of transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of same kind is known as pollination.

Difference between self-pollination and cross-pollination:

Self-pollination	Cross-pollination
When pollen grains are transferred from an anther to stigma of the same flower of the same plant, it is called self-pollination.	When pollen grains are transferred from an anther to stigma of genetically different plant, is called Cross-pollination.

Q2. Explain how asexual reproduction takes place in yeast.

Ans. Budding is a form of asexual reproduction which occurs in unicellular organisms such as yeast, multicellular organisms such as *Hydra*, etc. In budding, a bulb-like projection called bud occurs on the body of the parent organism. This bud increases in size and eventually breaks off from the parent organism, forming an independent individual.

Q3. Draw a neat and well-labelled diagram of a flower with all parts labeled.

Q4. Write down the characteristics of insect – pollinated plants.

Ans. Plants in which pollination takes place with the help of insects are called insect-pollinated plants. Flowers of insect-pollinated plants have sweet smell, brightly coloured petals and are rich in nectar. They have sticky stigma and sticky pollen grains.

Q5. How wind-pollinated flowers are different from water-pollinated flowers?

Ans. Wind-pollinated flowers are small, not brightly coloured and do not produce nectar (a sweet liquid produced by flowers).

Water-pollinated flowers are small, hidden, nectarless and odourless. Pollen grains and stigmas are unwettable.

C. Long Answer Questions

Q1. Describe various dispersal methods of fruits and seeds.

Ans. Seeds and fruits may be carried away to distant places by the agency of wind, water, animals, etc., and by special means such as explosion.

i) Wind dispersal : Some seeds have hairs or wings so that they can be carried over long distances by even the gentlest breeze. For example, wheat, rice, maize.

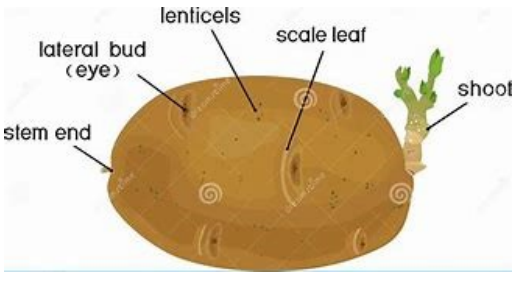
ii) Water dispersal : Seeds or fruits of plants which grow near water or in water are carried too far off places by water. For example, coconut, lotus, water lily.

iii) Dispersal by animals : Animals help in the dispersal of seeds in various ways. Some fruits and seeds are spiny or hooked which get attached to the bodies of animals and are carried to distant places, e.g., dates, tomatoes, sunflower.

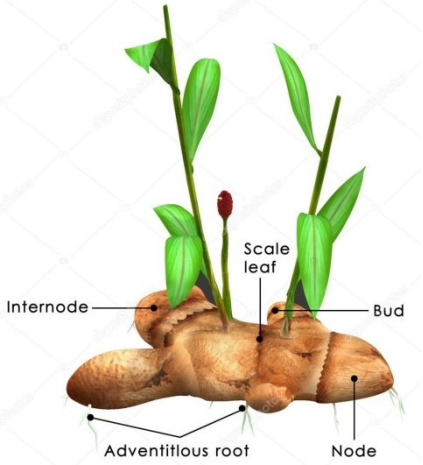
iv) Dispersal by explosion : Sometimes fruits of certain plants burst open forcibly after drying and their seeds are scattered in all directions, *e.g.*, , pea, castor, etc., burst with sudden jerks.

Q2. Draw a neat and labeled diagram of

a) Tuber of potato



b) rhizome of ginger

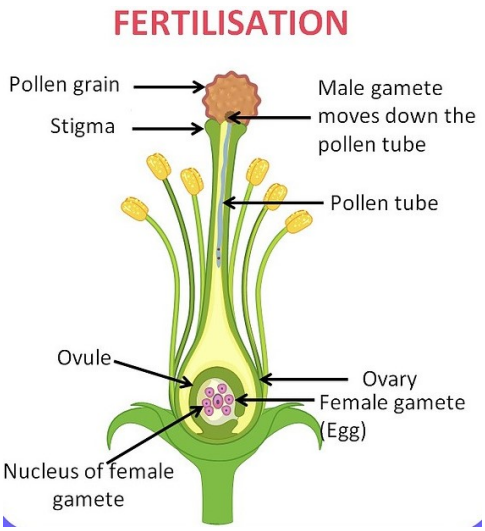


c) bulb of onion

Q3. Explain the process of fertilization with the help of diagram. What changes take place in a flower after fertilization?

Ans. The process of fusion of a male and a female gamete to form a zygote is called fertilisation. On reaching the stigma, pollen grain germinates and produces a thin pollen tube, which extends through the style, reaches the ovary and enters the ovule. The pollen tube contains male gamete. The male gamete fuses with the female gamete and forms a zygote.

After fertilisation, the ovary increases in size and becomes the fruit. The ovules become the seeds. The sepals, petals and other parts of flower shed off.



Q4. Write a short note on vegetative propagation in plants.

Ans. Vegetative propagation is a type of reproduction in which new plants are produced from vegetative parts of the plant such as roots, stems, leaves, buds, etc.

(i) Natural vegetation propagation

In nature, plants may propagate vegetatively through all plant parts, like roots, stems and leaves.

(a) Vegetative reproduction by roots: Example, mint, and sweet potato.

(**b) Vegetative reproduction by stems:** Example, potato, sugarcane.

(c) Rhizome: Example, ginger, turmeric.

(d) Bulbs: Example, onion, garlic.

(e) Vegetative reproduction by leaves: *e.g.*, *Begonia*, *Bryophyllum*, etc.

(ii) Artificial vegetative propagation:

The process of growing new plants by artificial methods is known as artificial propagation. Some of these methods are as follows :

(a) Cutting : Example, rose, *Bougainvillea* and sugarcane.

(b) Layering : Example, jasmine, vines, cherry, strawberry, etc.

(c) Grafting : Example, rose.

Q5. Describe the various methods of asexual reproduction in plants.

Ans. Various methods of asexual reproduction in plants are:

(i) Budding : In this method, a bulb-like projection called bud occurs on the body of the parent organism. This bud increases in size and eventually breaks off from the parent plant, forming an independent individual. Example, hydra.

(ii) Fragmentation means that an organism breaks up into two or more pieces called fragments. For example, *Spirogyra (*algae).

Page 129-130

Subject Enrichment

B. Practical Based Questions

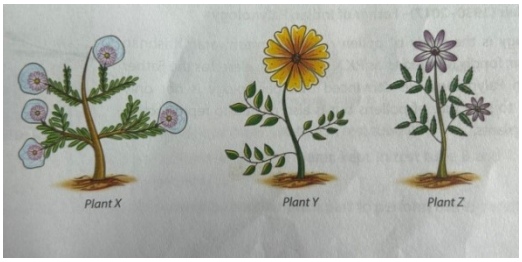
Q. Rajesh searched three plants X , Y and Z in his garden. He watered them regularly and took good care of them. Soon flowers bloomed on each of them. He covered all flowers of palnt X with a polybag and left the remaining plants as such. Both plant X and Z bore fruits.

a) Which plant is surely self – pollinated out of the given plants?

b) Why do you think fruits are absent on plant Y?

c) Which plant bears bisexual flowers?

d) Comment whether plant Z is self – pollinating or cross – pollinating



Ans.(a) Out of the given plants, plant X is surely self-pollinating. As all flowers of plants X were covered with polybags and they bore fruits.

(b) Plant *Y* is unisexual.

(c) Since both the plants X and Z bear fruits therefore they are most likely to have bisexual flowers.

(d) Plant Z is most likely to be self-pollinating as it bears fruits.

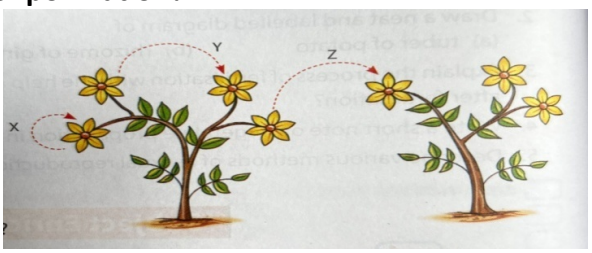
C. Diagram Based Questions

Q. The given figure shows the different types of pollination in plants.

a) Which out of X , Y and Z introduces genetic variation in plants?

b) Which type of pollination is not dependent on any agent of pollination?

c) What are the advantages of process Z?



Ans. (a) Z represents cross-pollination. It introduces genetic variation in plants.

(b) X is not dependent on any agent of pollination.

(c) Advantages of cross-pollination (*Z*) are:

(i) It helps to bring variation.

(ii) It helps to improve immunity of offsprings against environmental stress and diseases.

(iii)Large number of pollens are produced.

D. Value Based Questions

Q. Ram is 42 years old and lives in a village of Assam. His house is surrounded by a number of bamboo trees. He has not seen flowering in bamboo trees till date. How will you explain this? How do such plants propagate?

Ans. Most bamboo trees flower only once in their life cycle. Some species flower every 40-50 years. Therefore Ram has not seen bamboo flower. Vegetatively bamboo propagate through culm cutting, rhizome, offsets, layering, etc.

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HOTS Questions

Q1. How grafting helps in mixing characters of two different plants? What qualities should be considered while choosing stock or scion for grafting?

Ans. In grafting, stem cutting with buds of one plant, called the scion, is kept over the cut stem with roots of another plant, called the stock. The scion and the stock are then firmly tied together. The stock supplies the essential nutrients to the scion. Since stem of two different plants are combined, therefore the features of two plants are also combined.

Qualities: Characteristics like compatibility, growth rate, environmental adaptability, high-yielding varieties and disease-resistant varieties must be considered while choosing stock and scion before grafting.

Q2. Flowers are the reproductive organs in plants. This job is exclusively done by their attractive entities. Then why did plants choose to propagate vegetatively in nature?

Ans. Plants employ both sexual and vegetative propagation as survival strategies. While flowers facilitate sexual reproduction, vegetative propagation (such as through runners, bulbs or cuttings) offers advantages like faster propagation, maintaining favourable traits and adapting to specific environmental conditions. Vegetative reproduction can be more efficient to maintain genetic traits ensure seed production. It is a strategic balance in the plant kingdom to enhance overall survival and adaptation.

CHAPTER 9

Motion and Time

SOLUTIONS

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Sci. Quest

Q. Can you name any other two devices used to measure time in ancient time?

Ans. Water clock, Candle clock

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A. State True or false for the following statements:

1. True 2. True 3. True
4. False: The faster vehicle has a higher speed.
5. False: Time gap between two events is called duration or an interval.

B. Fill in the blanks:

1. Time 2. Periodic 3. Periodic motion 4. Sundial 5. Train

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Sci. Quest

Q. What is second pendulum?

Ans. A pendulum having time period equal to two seconds is called a second pendulum.

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Sci. Quest

Q. How much time is taken by sunlight to reach the Earth?

Ans. 8 minutes and 20 seconds.

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State True or false for the following statements:

1. False : Light year is a unit of distance.
2. False : Distance covered by moving car in 1 hr = 60 km
3. Distance covered by moving car in (30 min) $\frac{1}{2}$ hr= 60× $\frac{1}{2}$ = 30 km True
4. True
5. True

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Exercise

Objective Questions

A. Select the correct option:

1. (c) : Meter scale
2. (b) : Second
3. (d) : Pounds per square inch
4. (c) 270 min.
5. (b) : 50 m/s

B. Fill in the blanks:

1. Periodic motion
2. Non-uniform
3. Pendulum clock
4. 70,560
5. X-(time)

C. Match the columns:

S.No.	Column I	Column II
1.	Odometer	Instrument used to measure the distance travelled by a moving car
2.	Time period	The time taken by a pendulum to complete one oscillation
3.	Sand clock	A device used in ancient time to measure time
4.	Second	A unit of time
5.	Time	Intervals between two events

D. State True or false for the following statements:

1. True
2. True
3. True
4. True
5. True

E. Circle the odd one out:

1. **mm/h** : It is the odd one out, as it represents a unit of speed over time but is on a much smaller scale compared to the other three, which are commonly used units for speed.
2. **Sundial** : It is the odd one out because it is not related to the oscillatory motion of a pendulum, unlike amplitude, time period and frequency.
3. **Mass:** It is not directly related to distance, speed and time which are all measures associated with motion.

Subjective Questions

A. Very Short Answer Questions

Q1. How year was defined by our ancestors?

Ans. A year was defined by our ancestors as the time taken by the Earth to complete one revolution around the Sun.

Q2. Is there any relation between distance travelled and time?

Ans. The relation between distance travelled and time is Speed = $\frac{\textbf{Distance travelled}}{\textbf{Time}}$

Q3. What is the SI unit of Speed?

Ans. The SI unit of speed is metre per second *i.e.*, m/s.

Q4. Why do we use stopwatch?

Ans. We use a stopwatch because it stands out for the accuracy and precision of time.

Q5. Define time period of a simple pendulum?

Ans. The time taken by a pendulum bob to make one complete oscillation is called time period of the pendulum.

Q6. Convert 36 km/h into m/s.

Ans. 36 km/h to m/s

$\frac{5}{18}$= 10 m/s

B. Short Answer Questions

Q1.The distance between two stations is 240km. A train takes 4 hours to cover this distance. Calculate the speed of train.

Ans. Distance between two stations = 240 km

Time taken to cover this distance = 4 hr

Speed of train = $\frac{240\ km}{4\ hr}$ = 60 km/hr

Q2. Amit's school bus travels 36km/h and Sushma's school bus travels at 11m/s Whose school bus travels faster

Ans. Speed of Amit s school bus = 36 km/hr

i.e. $\frac{36\ X\ 1000}{60\ X\ 60}$ 10 m/s

Speed of Sushma s school bus = 11 m/s

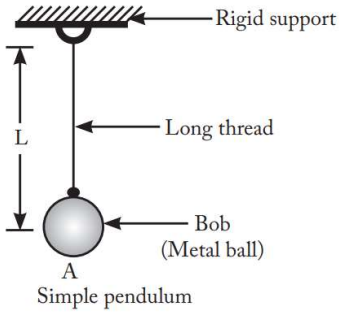
Sushma s school bus travels faster than Amit's school bus.

Q3. Explain sundial briefly.

Ans. People in older times used sundials to measure time. Sundial worked on the principle that as the position of the Sun in the sky is changed, then there is also a change in the position and length of the shadow cast by an object.

Q4. Explain the working of a simple pendulum with a neat and clean diagram.

Ans. A simple pendulum is a set-up that consists of a small metallic ball Rigid support suspended by a long thread from a rigid support such that the ball is free to swing back and forth (oscillates without friction).The normal or resting position of the bob is called its mean position.



Simple pendulum

Q5. How can we change the time period of a pendulum?

Ans. The time period of a pendulum depends on its length. As length of pendulum is increased, its time period also increases. The time period of a pendulum of given length is constant. Bob (Metal ball)

Q6. Why do we need to measure time?

Ans. Time is a phenomenon by which human beings observe and record changes in the environment and the universe. Time is often used to distinguish between the present, past and future.

C. Long Answer Type Questions

Q1. a) Convert the following as directed:

i) 3720 seconds into minutes.

ii) 2 years (365 days each) into hours

Ans. 1. (a) (i) 1 minute = 60 seconds

1 second = $\frac{1}{60}$ minutes

3720 seconds = $\frac{3720}{60}$ min = 62 minutes

(ii) In 1 day = 24 hr

In 365 days or 1 year = 365 X 24 = 8,760 hrs

In 2 years = 8760 X 2 = 17,520 hr

b) A rocket travels at a speed of 15,000 m/s . Find out the distance travelled by the rocket, if time taken is 250 second.

Ans: (b) Speed of the rocket = 15,000 m/s Time taken by the rocket = 250 sec

Speed = $\frac{Distance}{Time}$

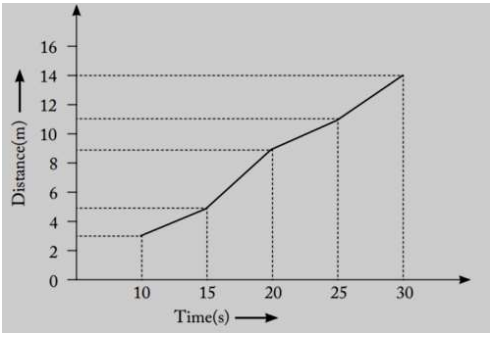
Distance = Speed X Time

15000 m/s X 250 s = 37,50,000 m or 3750 km

Q2. Draw a distance – time graph using the following tables and examine whether the motion is uniform / non – uniform?

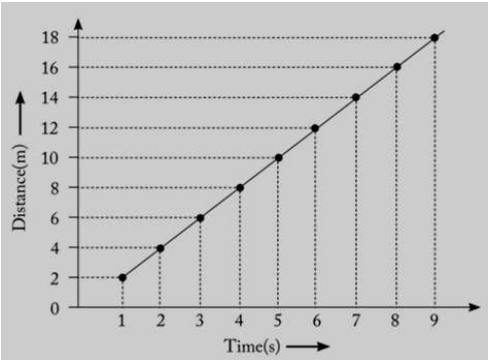
(a)

Distance (m)	3	5	9	11	14
Time (s)	10	15	20	25	30



(b) Here, we can clearly see that motion is non-uniform in nature.

Distance (m)	2	4	6	8	10	12	14	16	18
Time (s)	1	2	3	4	5	6	7	8	9



Here, we can clearly see that motion is uniform in nature.

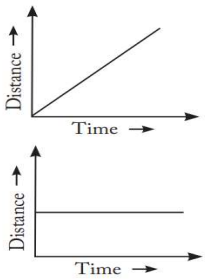
Q3. Write a short note on different types of clocks used from ancient time to present.

Ans. People in older times used different instruments, such as sundials and hour glass to measure time. Sundial worked on the principle that as the position of the sun in the sky changed, so did the position and length of the shadow cast by on object. Hourglass measures the passage of time from a few minutes to an hour. It has two vertically connected glass bulbs, allowing a regulated trickle of a material from the top bulb to the bottom bulb. The material used can be fine sand. In the present time, people use clock and watches to measure time, which works on the principle of periodic motion.

Q4. Show the shape of distance – time graph for the mentions in following.

a) A boy running with constant speed.

b) A boy standing on the roadside.



Ans. (a) Boy running with constant speed means he covers equal distance in equal intervals of time. The graph obtained is a straight line.

(b) A boy standing on a side road means distance does not change with time. **Therefore, the boy is in stationary state. The distance-time graph is shown as a horizontal line parallel to time axis.**

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Subject Enrichment

B. Practical Based Questions

Q1. With the help of the speedometer reading of a vehicle, would you be able to find the distance travelled, if the time is known?

Ans. No, speedometers gives us the value of instantaneous speed. Therefore, distance travelled cannot be calculated.

Q2. Sarita walks to her school in 40 minutes as her school is 3km far away from her home. On reaching she finds that the school is closed and comes back by bus and reaches home in 20 minutes. What is the average speed in Km/h?

Ans. Distance of school from her home d_1 = 3 km

Time taken to reach the school by walk, t = 40 min

$= \frac{40}{60}$ h $= \frac{2}{3}$ = hrs

Time taken to reach back to home by bus, t = 20 min.

$= \frac{20}{60}$ h $= \frac{1}{3}$ = hrs

Average speed = $\frac{\text{Total distance}}{\text{Total time taken}} = \frac{2d1}{t1 + t2} = \frac{3+3}{\frac{2}{3}+\frac{1}{3}}$ = 6 km/h

C. Diagram Based Questions

Q1. Refer to the given figures and answer the following questions.

a) Identify A,B,C & D

b) Briefly explain the working of C.

c) How A is better than B ?

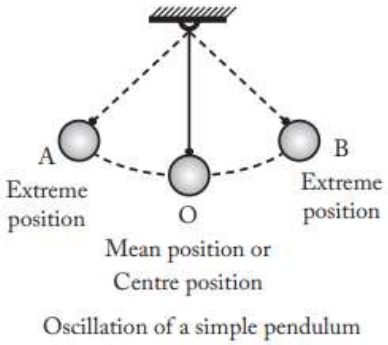
d) Why D is better than a mechanical watch?

Ans. (a) A) Digital watch

B) Hourglass

C) Pendulum Clock

D) Alarm Clock



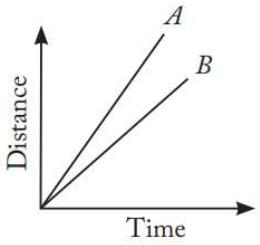
Oscillation of a simple pendulum

(b) A simple pendulum consists of a metal bob hung by a string connected to a fix point. The bob oscillates in to and fro motion. The movement from mean to one extreme and then to the other extreme and again back to the mean is called a complete oscillation.

(c) A (digital clock) is better than B (hourglass) because hourglass always shows the number of hours spent, while a digital watch displays the exact time in terms of hours, minutes and seconds.

(d) An alarm clock and a mechanical watch serve different purposes. An alarm clock is designed to wake you up at a specific time, offering a practical function. On the other hand a mechanical watch is primarily a time keeping accessory. Comparing them depends on the context of use one for timekeeping, the other for waking up.

Q2.Figure shows the distance – time graph for the motions of two vehicles A and B. Which one of them is moving faster?



Ans. From the graph it is clearly seen that for a given time t, the distance covered by vehicle A is more than vehicle *B*. Hence, vehicle *A* is moving faster than vehicle *B*.

C. Value Based Question

Q. On her birthday, Priya planned to have a birthday party with her friends at her favourite restaurant at 6:00 pm. While driving, she increased speed of the car from 46 km/h to 54 km/h. On her way to the restaurant, she found an injured person lying on the road. She rushed him to a nearby hospital. Due to this she got late by an hour and got scolded by her friends for being late on her own party.

a) Calculate the increase in speed of the car in unit of m/s.

b) What values were shown by Priya here?

Ans. (a) Initial speed of Priya s car = 46 km/h = $\frac{46\times1000}{60\times60}$ = 12.78 m/s

Increased speed of Priya s car = 54 km/hr = $\frac{54\times1000}{60\times60}$ = 15 m/s

Total increase in speed of the car = 15 - 12.78 = 2.22 m/s

(b) Priya quickly stopped the car and provided aid to the injured person which shows she was caring and helpful. She valued the stranger s life more than her birthday which showed her compassion towards the needy people.

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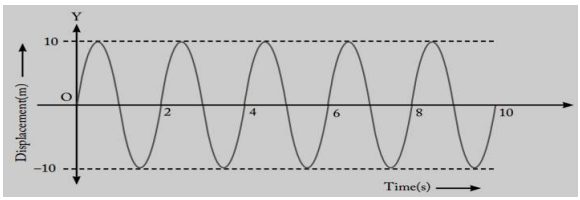
HOTS Questions

Q1. A Graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.



(Note : Displacement is the change in the position of a moving body in a particular direction.)

Ans. Oscillation is going to and fro motion repeatedly between two extreme positions or state. It is a periodic motion because it repeats itself in a regular cycle as shown in above figure.

So, the number of oscillations performed by the bob at the end of 10th second = 5

Q2. In a race, Rohan and Samar reach the finishing point in 20 sec and 22 sec, respectively.

a) What is the ratio of their speeds?

b) If both are allowed to run with their respective speeds for a given time, what is the ratio of the distance covered by them?

Ans. (a) Time taken by the Rohan to reach the finishing point, t_1 = 20 sec

Time taken by Samar to reach the finishing point, t_2 = 22 sec

Let the distance covered by Rohan = S_1

Let the distance covered by Sonam = S_2 and distance is same for both

So, $S_1 = S_2 = v_1t_1 = v_2t_2$

$\frac{v_1}{v_2} = \frac{t_2}{t_1} = \frac{22}{20} = \frac{11}{10}$

The ratio of their speeds = 11:10

(b) $\frac{S1}{S2} = \frac{v_{1t}}{v_{2t}}$ (∵ time is same for both)

$\frac{S1}{S2} = \frac{v_1}{v_2} = \frac{11}{10}$

The ratio of the distance covered by them = 11 : 10