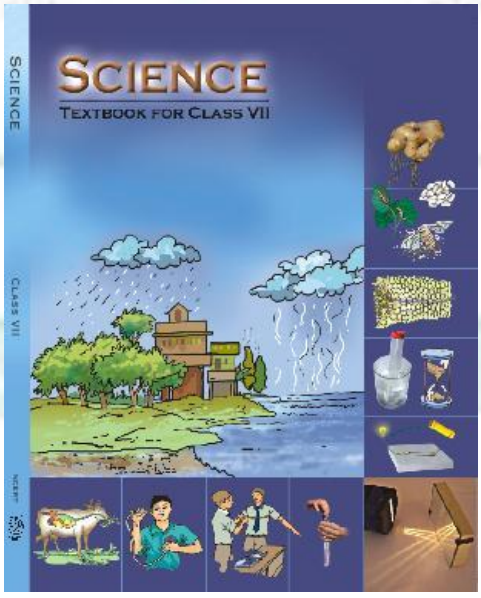
पुना International School
Shree Swaminarayan Gurukul, Zundal

CLASS – VII

SCIENCE

July – August month



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Chapter – 5
Acids, Bases and Salts

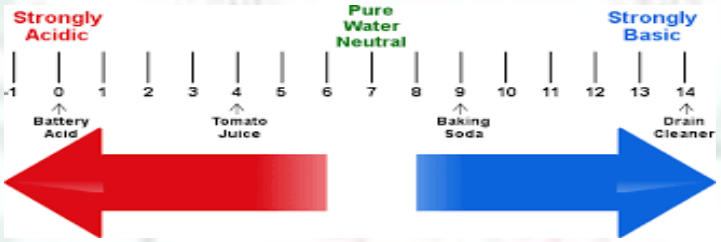
Key words:-

- There are three types of Substances: Acids, Bases and Salts

- **Acids:** Acids are sour in taste.
  They are corrosive in nature. A concentrated acid cuts through clothes and eats away the wool. If it falls on the skin, it can cause burns.
  They are good conductors of electricity, as they allow the passage of electric current through them.

- **Types of Acids:**
  (i) **Mineral Acids:** These are acids prepared from minerals present in the earth's crust.
  (ii) **Organic Acids:** These are acids produced by plants and animals (except hydrochloric acid).
  (iii) **Weak Acids:** These do not dissociate completely in solution. Example: tartaric acid, lactic acid.
  (iv) **Strong Acids:** These dissociate completely in solution. Example: nitric acid, sulphuric acid.
- **Neutralization**: It is the reaction between an acid and a base which results in formation of salt and water.
  Acid + Base →→ Salt + Water
  Example: HCl + NaOH →→ NaCl + H_2O

- **Bases:** Bases are bitter in taste and soapy to touch.
  Types of Bases:
  (i) **Weak Bases:** These naturally produce less hydroxide ions in solution. Example: magnesium hydroxide, ammonium hydroxide.
  (ii) **Strong Bases:** These produce more number of hydroxide ions on dissolving in water.
  Example: Sodium hydroxide(NaOH), Potassium hydroxide (KOH)



- **Indicators:** It is special chemical that changes its colour to indicate the presence of a chemical substance.
- It is used to confirm the presence of an acid, a base or a neutral solution.
- **Classification of Indicators:**
  Natural Indicators:(i) **Litmus:** It is extracted from lichens. It is available in the form of strips of paper or in the form of a solution.· Acid turns blue litmus red. Bases turn red litmus blue.
  (ii) **Turmeric:** It remains yellow in neutral and acidic solutions but turns red in alkaline solutions.
  (iii) **China rose:** It turns acidic solutions to dark pink (magenta) and basic solution to green.

(iv) **Red cabbage:** It turns acidic solutions to red and basic solutions to blue.

Other Indicators:
(i) **Methyl Orange**: It gives pinkish red colour with acidic solutions and yellow colour with bases.
(ii) **Phenolphthalein**: It is an acid-base indicator. It is colourless in acidic solutions but turns pink in alkali solutions.

EXTRA QUESTION ANSWERS:-
VERY SHORT ANSWER QUESTIONS

1. Paheli is suffering from indigestion due to acidity. Is it advisable to give her orange juice in this situation and why?

Ans. She is suffering from acidity due to increase in the amount of hydrochloric acid present in her stomach. It is not at all advisable to offer orange juice to such a patient as the juice itself is acidic in nature. In case of acidity the patients must be offered with a base that can neutralize the acid and convert it to salt and water. She can be offered milk of magnesia.

2. While playing in a park, a child was stung by a wasp. Some elders suggested applying paste of baking soda and others lemon juice as remedy. Which remedy do you think is appropriate and why?

Ans. Wasp sting inject a liquid in the skin which is acidic in nature. Hence, baking soda is the appropriate remedy, as it is basic in nature and neutralises the acid. Whereas lemon juice being acidic itself is not advisable.

3. Form a sentence using the following words – baking soda, ant bite, moist, effect, neutralised, rubbing.

Ans. The effect of an ant bite can be neutralised by rubbing moist baking soda.

4. A farmer was unhappy because of his low crop yield. He discussed the problem with an agricultural scientist and realised that the soil of his field was either too acidic or too basic. What remedy would you suggest the farmer to neutralise the soil?

Ans. Excessive use of chemical fertilisers makes the soil acidic. Plants do not grow well when the soil is either too acidic or too basic.

If the soil is too acidic, it is treated with bases such as quick lime (calcium oxide) or slaked lime (calcium hydroxide).

If the soil is too basic, organic matter is added to it. Organic matter releases acids which neutralises the basic nature of the soil.

5. You are provided with four test tubes containing sugar solution, baking soda solution, tamarind solution, salt solution. Write down an activity to find the nature (acidic/basic/neutral) of each solution.

Ans. Activity
- Take strips of blue and red litmus papers.
- Put a drop of the above solutions one by one each strip of the red litmus paper with the help of a dropper. Is there any change in colour?
- Repeat the same exercise with the blue litmus paper.

If blue litmus changes to red the solution is acidic. If red litmus changes to blue the solution is basic. If there is no change in colour of the litmus paper then the solution is neutral.

6. Explain two neutralisation reactions related to daily life situation.

Ans. The reaction between an acid and a base is known as Neutralisation Reaction. Salt and water are produced in this process with the evolution of heat.

$$Acid + Base \rightarrow \underset{(Heat\ evolved)}{Salt + Water}$$

Two daily life situations related to neutralisation reaction is:

(i) **Indigestion:** Our stomach contains HCI, it helps in digestion. But too much of acid in the stomach cause indigestion. It can be painful. To relieve indigestion, we take antacid, such as milk of magnesia which neutralises the effect of excessive acid as it contains a base- magnesium hydroxide.

(ii) **Ant Bite**: When an ant bites it injects formic acid into the skin. The effect can be neutralized by rubbing moist baking soda(sodium hydrogen carbonate) or calamine solution, which contains zinc carbonate.

EXERCISE:-

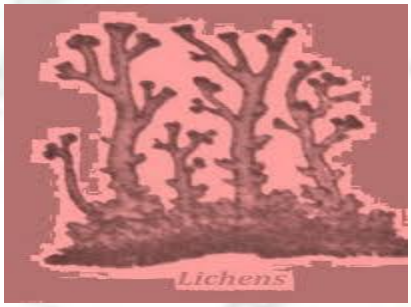
Question 1. State differences between acids and bases.

Answer

Acids	Bases
(i) Acids are sour in taste.	(i) Bases are bitter in taste.
(ii) It turns litmus paper red.	(ii) It turns litmus paper blue.
(iii) It doesn't change the colour of turmeric indicator.	(iii) It changes the colour of turmeric indicator to red.
(iv) It doesn't feel soapy on touching.	(iv) It feels soapy on touching.

Question 2. Ammonium is found in many household products, such as window cleaners. it turns red litmus blue. What is its nature?
Answer: Ammonia has basic nature.

Question 3. Name the source from which litmus solution is obtained. What is the use of this solution?
Answer: Lichens. It is used as indicator to determine whether the given solution is acidic or basic.



Question 4. Is the distilled water acidic, basic or neutral? How would you verify it?
Answer: Distilled water is neutral.It can be verified with the help of red and blue litmus paper. It shows no change with both kind of litmus paper.

Question 5. Describe the process of neutralization with the help of an example.
Answer: The process in which an acid reacts with a base to form salt and water is known as neutralisation reaction. The reaction is given below,

The reaction can be written as:

Hydrochloric acid(HCl) + Sodium hydroxide(NaOH) → Sodium Chloride(NaCl) + Water (H_2O)

Question 6. Mark 'T' if the statement is true and 'F' if it is false:

(i) Nitric acid turns red litmus blue. (T/F)
(ii) Sodium hydroxide turns blue litmus red. (T/F)
(iii) Sodium hydroxide and hydrochloric acid neutralise each other and forms salt and water. (T/F)
(iv) Indicator is a substance which shows different colours in acidic and basic solutions. (T/F)
(v) Tooth decay is caused by the presence of a base. (T/F)

Answer: (i) F (ii) F (iii) T (iv) T (v) F

Question 7. Dorji has a few bottles of soft drink in his restaurant. But, unfortunately these are not labelled. He has to serve the drinks on the demand of customers. One customer wants acidic drink; another wants basic and third one wants neutral drink. How will Dorji decide which drink it to be served to whom?
Answer: He can decide by the use of indicator. If the sample of drink turns red litmus blue, it is basic. If it does not turn blue litmus red, it is acidic. If it does not affect litmus, it is neutral.

Question 8. Explain why:

(a) An antacid tablet is taken when you suffer from acidity.
(b) Calamine solution is applied on the skin when ant bites.
(c) Factory waste is neutralised before disposing it into the water bodies.

Answer: (a) Antacids are nothing but bases. When there is excess of acid in stomach antacid tablet neutralize the acids and relieve us.

(b) Ant injects an acid during bite which causes the burning sensation. Calamine solution is basic in nature. It neutralises the acid and relieves from the pain.
(c) Factory wastes contain both acidic and basic substances. These are harmful for the organisms living in water. So, these are should be neutralized before disposing.

Question 9. Three liquids are given to you. One is hydrochloric acid, another is sodium hydroxide and third is a sugar solution. How will you identify them? You have only turmeric indicator.
Answer: Dip the turmeric indicator in each liquids. The liquid in which the colour of turmeric indicator changes to red is basic in nature i.e. sodium hydroxide. Since, we already identified sodium hydroxide. We will pour the sodium hydroxide in other two bottles. The liquid which get warm after pouring the sodium hydroxide(base) in it is of hydrochloric acid as heat gets evolved in the neutralisation process. The last one which shows no effect is liquid of sugar solution.

Question 10. Blue litmus paper is dipped in a solution. It remains blue. What is the nature of the solution? Explain.
Answer: The above solution could be a base or a neutral solution because blue litmus paper doesn't change its colour in the neutral as well as basic solution.

Question 11. Consider the following statements:

(a) Both acids and bases change colour at all indicators.
(b) If an indicator gives a colour change with an acid, it does not give a change with a base.
(c) If an indicator changes colour with a base, it does not change colour with an acid.
(d) Change of colour in an acid and a base depends on the type of the indicator.

Which of these statements are correct?

(i) All four
(ii) a and b
(iii) b and c
(iv) only d.

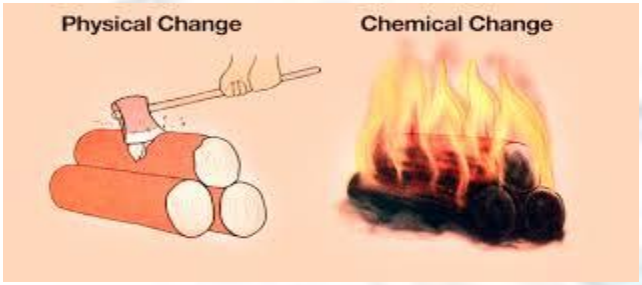
Answer: (iv) only d.

Chapter – 6
Physical and Chemical Change

- **Key words:-**
- Changes can be of two types, physical and chemical.

1. **Physical changes** are changes in the physical properties of substances. No new substances are formed in these changes.These changes may be reversible. Example: crushing a can, glowing of an electric bulb, tearing of paper, mixing of sand and water.

2. **Chemical Changes** are changes in which the composition and chemical properties of the substance get changed. In chemical changes new substances are produced. This change is permanent and irreversible.
   Example: burning of a candle, formation of curd from milk, ripening of fruits.



Rusting of Iron: Rusting is the process in which iron turns into iron oxide**.** It happens when iron comes into contact with water and oxygen. The process is a type of corrosion that occurs easily under natural conditions.

Prevention of Rusting:

(i) By Painting
(ii) By Oiling and greasing
(iii) By Chromium plating
(iv) By Galvanizing
(v) By Alloying

EXTRA QUESTION ANSWERS:-

1)Why we say 'Melting of wax' is a physical change?

Ans:Explanation: Melting of wax is a physical change where a solid changes to liquid state. This change can be reversed (liquid wax can be solidified to form solid wax). No new substance is formed during the melting of wax.

Rusting of iron is a chemical change. Combustion of magnesium ribbon is also a chemical change. Burning of candle is a physical as well as a chemical change.

2) Melting of wax is a change where a solid changes to liquid state. Give one more such change which you observe in your surroundings.

Ans: Melting of ice is a change where ice (solid) changes to water (liquid).

(Similar examples of such type may be given)

3) What kind of change is shown by tearing of paper?

Ans: Tearing of paper is a physical change that cannot be reversed.

4) Explain the following:

(a) Lime water turns milky on passing carbon dioxide gas into it.

(b) Bubbles are produced when acetic acid is added to a solution of sodium hydrogen carbonate.

Ans: (a) Lime water turns milky on passing carbon dioxide gas through it due to a chemical reaction between lime water and carbon dioxide. The chemical reaction results in the formation of insoluble calcium carbonate (white coloured precipitate).

(b) When acetic acid is added to a solution of sodium hydrogen carbonate, carbon dioxide is evolved. This is due to a chemical reaction between acetic acid and sodium hydrogen carbonate.

LONG ANSWER QUESTIONS

1) Give two examples for each of the following cases:

(a) Physical changes which are reversible.

(b) Physical changes which are not reversible.

(c) Chemical changes.

Ans:

(a) Two examples of physical changes, which are reversible, are:-

i) Folding of paper **ii)** Melting of ice

(b) Two examples of physical changes, which are not reversible, are:-

i) Tearing of paper **ii)** Breaking of glass

(c) Two examples of chemical changes are:-

i) Reaction between vinegar and baking soda **ii)** Burning of a match-stick.

There can be many other examples in each case.

2) A student took a solution of copper sulphate in a beaker and put a clean iron nail into it and left it for about an hour.

(a) What changes do you expect?

(b) Are these changes chemical in nature?

(c) Write a word equation for the chemical change, if any.

Ans: (a) The following changes are expected when a clean iron nail is put into a solution of copper sulphate:-

(i) Colour of the solution in the beaker will change from blue to green. Iron will displace copper from its solution.

(ii) A brown coloured deposit (copper) would be found on the surface of the iron nail.

(b) Yes, the changes are chemical in nature as new substances are formed. The new substances will be iron sulphate (green in colour) and copper (brown in colour).

(c) Word equation for the chemical change is as follows:-

$$\underset{\text{blue}}{\text{Copper sulphate}} + \text{Iron} \rightarrow \underset{\text{green}}{\text{Iron Sulphate}} + \underset{\text{brown}}{\text{Copper}}$$

EXERCISE:-

Question 1. Classify the changes involved in the following processes as physical or chemical changes:
(a) Photosynthesis
(b) Dissolving sugar in water
(c) Burning of coal
(d) Melting of wax
(e) Beating aluminum to make aluminum foil.
(f) Digestion of food

Answer: (a) Chemical change
(b) Physical changes
(c) Chemical change
(d) Physical change
(e) Physical change
(f) Chemical change

Question 2. State whether the following statements are true or false. In case a statement is false, write the corrected statement in your notebook.

(a) Cutting a log of wood into pieces is a chemical change. (True/False)
(b) Formation of manure from leaves is a physical change. (True/False)
(c) Iron pipes coated with zinc do not get rusted easily. (True/False)
(d) Iron and rust are same substance. (True/False)
(e) Condensation of steam is not a chemical change. (True/False)

Answer: (a) False- cutting a log of wood into pieces is a **physical change**.
(b) False- formation of manure from leaves is a **chemical change**.
(c) True
(d) False- Iron and rust are **different** substances.
(e) True

Question 3. Fill in the blanks in the following statements:

(a) When carbon dioxide is passed through lime water, it turns milky due to formation of -------
(b) The chemical name of baking soda is ----------.
(c) Two methods by which rusting of iron can be prevented are --------- and ------.
(d) Changes in which only ---------- properties of a substance change are called physical changes.
(e) Changes in which new substances are formed are called ---------- changes.

Answer: Fill in the blanks in the following statements:

(a) When carbon dioxide is passed through lime water, it turns milky due to formation of **calcium carbonate**.
(b)The chemical name of baking soda is **sodium hydrogen carbonate**.
(c) Two methods by which rusting of iron can be prevented are **painting** and **galvanization**.

(d) Changes in which only **physical** properties of a substance change are called physical changes.
(e) Changes in which new substances are formed are called **chemical** changes.

Question 4. When baking soda is mixed with lemon juice, bubbles are formed with the evolution of a gas. What type of change is it? Explain.
Answer: When baking soda is mixed with lemon juice, the bubbles which are formed with the evolution of a gas is due to the evolution of carbon dioxide gas. Since, there is formation of a new substance in this reaction, it is a chemical change.

Question 5. When candle burns, both physical and chemical changes take place. Identify these changes. Give another example of familiar process in which both the chemical and physical changes take place.
Answer: The wax of the candle first melt then vaporizes and burns.
Melting of wax is a physical change since melted wax can be solidified back to the wax and there is not new substance is formed.
When wax burns, smoke and carbon dioxide is formed which are new substance. So, it is a chemical change.
Cooking of food is both physical and chemical because raw vegetables get cooked which is a chemical change and the water changes into steam which is a physical change.

Question 6. How would you show that setting of curd is a chemical change?
Answer: The curd is formed from milk. Both curd and milk have different properties. Also, once the curd is formed it cannot be reversed back into milk. So, there is formation of new substance with different properties and also an irreversible process, setting of curd is a chemical change.

Question 7. Explain why burning of wood and cutting it into small pieces are considered as two different types of changes.
Answer: Burning of wood produces ash and smoke. Hence the properties of wood are changed and new substances are formed. So, it is a chemical change.

When a log of wood is cut into small pieces, there is no new substance formed. Each small piece bears the properties of wood. So, it is a physical change. Obviously, burning and cutting of wood are two different type of changes.

Question 8. Describe how crystals of copper sulphate are prepared.
Answer: Crystals of copper sulphate are prepared by the method of crystallization.

The process is as followed:
Step 1: A cupful of water in a beaker is taken.
Step 2: Few drops of dilute sulphuric acid is added to it.
Step 3: Water is heated and when it starts boiling copper sulphate powder is added slowly while stirring till no more copper sulphate powder dissolved in it.
Step 4: Solution is filtered and let it cool without disturbance. After some time the crystals of copper can be observed in it.

Question 9. Explain how painting of an iron gate prevents it from rusting.
Answer: Painting of an iron gate prevents it from rusting because it cut the direct contact of iron from

the environment and therefore there is no further exposure of iron to oxygen in moisture which is the causes for rusting.

Question 10. Explain why rusting of iron objects is faster in coastal areas than in deserts.
Answer: In coastal areas there is more moisture in air due to the presence of sea. But, in desert there is a scarcity of water and hence air is almost dry there. Both air and moisture are necessary conditions for rusting. So, rusting is faster is coastal areas than in desert.

Question 11. The gas we use in the kitchen is called liquefied petroleum gas (LPG). In the cylinder it exists as liquid. When it comes out from the cylinder it becomes a gas (change A) then it burns (change B). The following statement s are pertain to these changes. Choose the correct one.

(i) Process – A is a chemical change.
(ii) Process –B is chemical change.
(iii) Both processes A and B is a chemical changes.
(iv)None of these processes is a chemical change.

Answer: (ii) Process –B is a chemical change.

Question 12. Aerobic bacteria digests animal waste and produce biogas (change –A).The biogas is then burnt as fuel(change-B). The following statements pertain to these changes. Choose the correct one.

(i) Process – A is a chemical change.
(ii) Process –B is a chemical change.
(iii) Both processes A and B are chemical changes.
(iv) None of these process is a chemical changes.

Answer: (iii) Both processes A and B are chemical changes.

Chapter – 7
Weather, Climate and Adaptations to Climate

Key words :-

- **Weather:** Weather is the day-to-day condition of the atmosphere at a place influenced by factors like humidity, temperature, wind speed, etc.
- **Humidity** is the amount of water vapour present in the atmosphere and is measured by a hygrometer.
- **Climate:** It is the average weather conditions at a specific place over a longer period of time.
- **Factor affecting climate:**
- **Topography**: It means the shape of a land.
- **Sea level:** Distance from the sea and nearby water bodies are one of the influential factors that affect the climate of a region.
- **Ocean currents**: Ocean currents can transfer heat energy from land to sea or vice versa thus affecting the temperature of the region
- **Prevailing winds**: Winds distribute particular air masses. The direction of the wind can determine the climate of a region.
- **Human influence:** While all the above are natural factors, we the humans are one of the most devastating factors that have triggered this climate change.
  Adaptations to Climate: The features and habits that help animals to live in a habitat are called adaptations.
- **Three regions are classified according to adaptation:**
  (i) **Polar Regions**: Polar regions have extreme climate. Sun does not rise at poles for 6 months and does not set for the other 6 months.
  (ii) **Tropical Rainforest**: Having hot summers and plenty of rainfall. Days and nights are almost equal in length throughout the year.
  (iii) **Desert**: Have extreme climate. Receive less rainfall and large amount of sunlight.

- **Migration:**
  (i) It is the mass movement of animals, mostly birds, from colder places to warmer regions to escape the cold, to breed or due to shortage of food.
  (ii) Birds are guided by the sun during the day and the stars at night.

  Example: Siberian crane comes to India from Siberia every year.

EXTRA QUESTION

VERY SHORT ANSWER QUESTIONS

1. "A fish dies when taken out of water whereas a wall lizard will die if kept under water." Mention the term used to describe such abilities that allow fish and lizard to survive in their respective habitats.

Ans: Adaptation is the term used to describe such abilities that allow fish and lizard to survive in their respective habitats - water and air.

2. Give one example of an animal that can live both in water and on land.

Ans: Frog (amphibian) is an animal that can live in water as well as on land.

3. Why is it difficult to predict the weather of a place while it is easy to predict its climate?

Ans: Weather is a complex phenomenon involving temperature, humidity, etc. which can vary at a place over a short period of time. That is why, weather of a place is difficult to predict.

Climate is the average weather pattern at a give place taken over a long period of time. Hence, climate of a place is easier to predict.

4. Name two animals each that live in Polar region and Tropical rain forests.

Ans: Animals that live in Polar regions: Polar bear / Penguin / Reindeer / Musk oxen

Animals that live in tropical rain forests: Red-eyed frog / Elephants / Lion-tailed Macaque

5. Write two common adaptive features of a polar bear which help in keeping it warm.

Ans: Two common adaptive features of a polar bear which help in keeping it warm are:

a) Layer of fat under skin

b) Thick white fur

6. Mention two adaptive features of penguin that help it in swimming.

Ans: Two adaptive features of penguin that help it in swimming are:

a) Streamlined body

b) Webbed feet

7. Differentiate between:

(i) Weather and climate

(ii) Humidity and rainfall

(iii) Climates of polar region and tropical rain forest

EXERCISE:-

Question 1. Name the elements that determine the weather of a place.
Answer: The elements that determine the weather of a place are:

(i) Temperature,
(ii) Humidity,
(iii) Rainfall, and
(iv) Wind speed

Question 2. When are the maximum and minimum temperatures likely to occur during day?
Answer: The maximum temperature of the day occurs occurs in the afternoon while the minimum temperature occurs generally in the early morning,

Question 3. Fill in the blanks:

(i) The average weather taken over a long time is called ----------.
(ii) The place receives very little rainfall and the temperature is high throughout the year, the climate of that place will be ---------- and ----------.
(iii)The two regions of the earth with extreme climatic conditions are _____ and _____.

Answer: (i) The average weather taken over a long time is called **climate**.
(ii) The place receives very little rainfall and the temperature is high throughout the year, the climate of that place will be **dry** and **hot**.
(iii) The two regions of the earth with extreme climatic conditions are **tropical** and **polar**.

Question 4. Indicate the type of climate of the following areas;

(a) Jammu and Kashmir: ----------.
(b) Kerala: ----------.
(c) Rajasthan: ----------.
(d) North-east India: ----------.

Answer: (a) moderately hot and wet.
(b) Hot and wet
(c) Hot and dry
(d) wet.

Question 5. Which of the two changes frequently, weather or climate?
Answer: Weather changes frequently.

Question 6. Following are some of the characteristics of animals:

(i) Diets heavy on fruits.
(ii) White fur

(iii) Need to migrate
(iv) Loud voice
(v) Sticky pads on feet.
(vi) Layer of fat under skin
(vii) Wide and large paws.
(viii) Bright colour
(ix) Strong tails
(x) Long and large beak.

For each of the following indicate whether it is adaptation for tropical rainforest or polar region.

Answer:

(i) Diets heavy on fruits.	Tropical rainforest
(ii) White fur	Polar regions
(iii) Need to migrate	Polar regions
(iv) Loud voice	Tropical rainforest
(v) Sticky pads on feet.	Tropical rainforest
(vi) Layer of fat under skin	Polar regions
(vii) Wide and large paws	Polar regions
(viii) Bright colour	Tropical rainforest
(ix) Strong tails	Tropical rainforest
(x) Long and large beak.	Tropical rainforest

Question 7. The tropical rain forest has large population of animals. Explain why it is so.
Answer: The tropical rainforest has a large population of animals due to favourable climatic conditions and easy availability of different kinds of foods. The regions is hot and humid with ample rainfall which supports the growth of animals and plants.

Question 8. Explain, with examples, why we find animals of certain kind living in particular climatic conditions.
Answer: The organisms interact with the environment to survive. So, it is necessary for the organism to have characteristics that suits the environment.

Polar bears have white fur so that they are not easily visible in the snowy background. It protects them from their predators. It also helps them in catching prey. The thick layer of fur and fat deposit inside the skin insulate them to survive in cold climate.

Physical activities on warm days necessitate cooling. So, the polar bear goes for swimming.

It is a good swimmer. Its paws are wide and large, which help not only to swim well but also walk with ease in the snow.

Question 9. How do elephant living in the tropical rainforest adapt itself?
Answer: The elephant has adapted to the conditions of rainforests in many remarkable ways. It uses the trunk as a nose because of which it has as strong sense of smell. The trunk is also used by it for picking

up food. Moreover, its tusks are modified teeth. These can tear the bark of trees that elephant love to eat. So, elephant is able to handle the competition for food rather well. Large ears of elephant help it to hear even soft sounds. They also help the elephant to keep cool in the hot humid climate of the rain forest.

Question 10. A carnivore with strips on its body moves very fast while catching its prey. It is likely to be found in
(i) Polar regions
(ii) deserts
(iii) Oceans
(iv) tropical rainforests **Answer:** (iv) tropical rainforests.

Question 11. Which features adapt polar bears to live in extremely cold climate?
(i) A white fur, fat below skin, keen sense of smell.
(ii) Thin skin, large eyes, a white fur.
(iii) A long tail, strong claws, white large paws.
(iv) White body.

Answer: (i) a white fur, fat below skin, keen sense of smell.

Question 12. Which option best describe a tropical region?
(i) Hot and humid.
(ii) Moderate temperature, heavy rainfall.
(iii) Cold and humid.
(iv) Hot and dry

Answer: (i) hot and humid.

Chapter – 8
Winds Storms and Cyclones

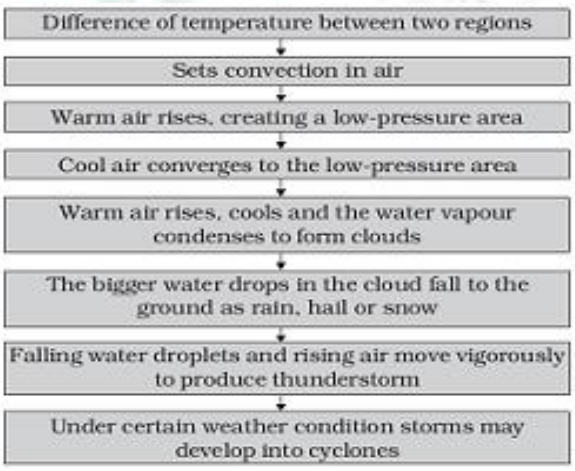
- **Key words:_**
- **Air:** The invisible gaseous substance surrounding the earth.

- **Composition of air**: By volume, dry air contains 78.09% **nitrogen**, 20.95% **oxygen**, amount of **water vapour**, on average around 1% at sea level, and 0.4% over the entire atmosphere. 0.93% **argon**, 0.04% **carbon dioxide**, and small amounts contains a variable
- **Properties of Air:**
  (i) Air around us exerts pressure.
  (ii) Air expands on heating and contracts on cooling.
  (iii) Warm air rises up, whereas comparatively cooler air tends to sink towards the earth's surface.
  (iv) As warm air rises, air pressure at that place is reduced and the cooler air moves to that place.

- **Wind:** The moving air is called wind. Air moves from region of high air pressure to region of low air pressure.

- **Types of Wind:**
  (i) **Wind Currents**: Wind currents are generated due to uneven heating on earth.
  (ii)**Thunderstorms**: Storm with thunder and lightning along with rain.

- Winds carrying water vapour bring rain.
- High-speed winds and air pressure difference can cause cyclones.
- It has become easier to monitor cyclones with the help of advance technology like satellites and radars.
- Self-help is the best help. Therefore it is better to plan in advance and be ready with defence against any approaching cyclone.
- The following flow chart will help you to understand the phenomena that lead to the formation of clouds and falling of rain and creation of storms and cyclones.



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EXTRA QUESTIONS:-

VERY SHORT ANSWER QUESTIONS

1. Why is Chandigarh unlikely to be affected by a cyclone?

Ans: The coast line of India is vulnerable to cyclones. Chandigarh is unlikely to be affected by a cyclone because Chandigarh lies in the hinterland; it is not near the sea.

2. Name the ocean which is mainly responsible for bringing rain-bearing monsoon winds to Kerala coast in June every year?

Ans: The Indian Ocean is mainly responsible for bringing the rain-bearing monsoon winds to Kerala coast in June every year.

3. Why is it advisable not to shut all the doors and windows during a storm?

Ans: It is not advisable to shut all the doors and windows during a storm. If all the doors and windows are shut during a storm, a low pressure will be created inside the house by the strong wind and the roof of the house may get blown away.

4. A flat in Mumbai with a balcony facing the sea has some clothes hung on a clothes line in the balcony. Towards which direction the clothes will be blown in the afternoon? Explain.

Ans: During afternoon, a sea breeze will blow from the sea towards the land in Mumbai. Hence, the clothes hung on a clothes line in the balcony of a flat will be blown towards the flat.

5. A flag mounted on a flag post near the sea coast flutters in the direction of sea. At what time of the day does this happen – at midnight or in the afternoon?

Ans: During the night, the wind blows from the land towards the sea. A flag mounted on a flag post near the sea coast will flutter in the direction of the sea at midnight.

6. When strong/high speed wind blows, an umbrella held upright at times gets upturned. Explain the reason.

Ans. When strong/high speed wind blows around an upright umbrella, a low pressure is created above the umbrella and the umbrella upturns.

7. Suggest some precautions to be taken to prevent the roof of a tin sheet from flying away during a fierce wind storm.

Ans: Some precautions that can be taken to prevent the roof of a tin sheet from flying away during a fierce wind storm are as follows:-

(i) Heavy stones may be put over the tin sheet.
(ii) The tin sheet may be screwed tightly to withstand the force of the wind.

LONG ANSWER QUESTIONS

1. Describe an activity to demonstrate that warm air is lighter than cool air.

Ans: Warm air is lighter than cool air. This can be proved by taking the example of a hot-air balloon. A hot-air balloon rises up due to the burning of fuel just below the balloon. The burning fuel heats up the air inside the balloon and the balloon rises up. When the fuel is cooled down, the balloon comes down and lands on the ground.

EXERCISE :-

Question 1. Fill the missing word in the blank spaces in the following statements:

(a) Wind is ---------- air.
(b) Winds are generated due to ---------- heating on the earth.
(c) Near the earth's surface ---------- air rises up whereas ---------- air comes down.
(d) Air moves from a region of ---------- pressure to a region of ---------- pressure.

Answer: (a) Wind is **moving** air.
(b) Winds are generated due to **uneven** heating on the earth.
(c) Near the earth's surface **warm** air rises up whereas **cold** air comes down.
(d) Air moves from a region of **high** pressure to a region of **low** pressure.

Question 2. Suggest two methods to find out wind direction at given place.

Answer: Two methods to find out wind direction at a given place:
(i)Take some sand and release it from height. The direction in which the sand starts flowing is the direction of the wind.
(ii) Take an air balloon and releases it in the open space. The balloon will starts moving in one direction which will give you idea about the direction of the wind at that place.

Question 3. State two experiences that made you think that air exerts pressure(other than given in the text).

Answer: (i) When we fill air in a balloon it inflates due to pressure exerted by air. Also when it is overfilled with air it bursts due to excess air pressure.
(ii) When we hang a banner in a place of moving fast air, it tears due to the pressure exerted by the air.

Question 4. You want to buy a house. Would you like to buy a house having windows but not ventilators? Explain answer.

Answer: No, I would not like to buy a house having windows but no ventilators because Ventilators are important for the circulation of air. Warm air is lighter which rises up and exit from the ventilators. Cool air is heavier and thus move in through window making the room comfortable for living. .

Question 5. Explain why holes are made in hanging banners and hoardings.

Answer: Holes are made in hanging banners and hoardings in order to tackle the air pressure. The air get passed through these holes made on the hoardings or banners and thus reduces the pressure of air on them. Therefore, the hoardings do not get blown away or torn due to air pressure.

Question 6. How will you help your neighbors in case cyclone approaches your village/town?

Answer: I will help by following ways:

(i) By warning everyone about the coming danger.
(ii) Searching for shelter.
(iii) Keeping storage of water and food.
(iv) Setting up first facility.

Question 7. What planning is required in advance to deal with the situation created by a cyclone?

Answer:(i) Setting up cyclone warning system.
(ii) Setting up cyclone shelter.
(iii) Setting up food and water storage.
(iv) Setting up first aid facility.

Question 8. Which one of the following places is unlikely to be affected by a cyclone?
(i) Chennai
(ii) Mangaluru (Mangalore)
(iii) Amritsar
(iv) Puri

Answer: (iii) Amritsar.

Question 9. Which of the statements given below is correct?

(i) In winter the winds flow from the land to the ocean.
(ii) In summer the winds flow from the land towards the ocean.
(iii)) A cyclone is formed by a very highpressure system with very highspeed winds revolving around it.
(iv) The coastline of India is not vulnerable to cyclones.

Answer: (i) In winter the winds flow from the land to the ocean.

Chapter – 9
Soil

- **KEY WORDS:-**
- Soil is the uppermost crust that covers the earth. It is a mixture of rock particles and humus.
- Soil is important for life on the earth.

- **Formation of Soil:**
  (i) Soil is formed by weathering or disintegration of parent rocks.
  (ii) Physical weathering is degradation of rocks by physical agents like water, ice, wind, sun, etc.
  (iii) Chemical weathering is chemical decomposition of rocks.
  (iv) Biological weathering is decomposition of parent rocks by bacteria and microorganisms.

- **Soil Profile**: It is the vertical section of soil from the ground surface to the parent rock. Soil profile is a section through different layers of the soil, Various layers are called horizons.

- **Constituents of Soil**: Soil consists of both living and non-living matter. These constituents make the soil fertile.

- **Types of Soil**: Soil is of different types: clayey, loamy and sandy.
  (i) **Sandy soil**: It contains soil particles with a diameter of 0.2 to 2.0 mm. It comprises of around 60% sand along with some clay. It has very low water retention capacity. It is not rich in humus.

  (ii) **Clayey soil**: It contains soil particles with a diameter of less than 0.2 mm. It has an excellent water retention capacity and air circulation is sufficient.

  (iii) **Loamy soil**: It contains a good mixture of sand, clay and humus. It has a good water retention capacity and air circulation is sufficient.

- Percolation rate of water is different in different types of soil. It is highest in the sandy soil and least in the clayey soil.

- Different types of soils are used to cultivate different types of crops. Clay and loam are suitable for growing wheat, gram and paddy. Cotton is grown in sandy loam soil.

- Soil holds water in it, which is called soil moisture. The capacity of a soil to hold water is important for various crops.
- Clayey soil is used to make pots, toys and statues.

EXTRA QUESTIONS:-

VERY SHORT ANSWER QUESTIONS

1. Soil has particles of different sizes. Arrange the words given below in the increasing order of their particle size:

Rock, Clay, Sand, Gravel, Silt

Ans: The increasing order of particle size in a soil is as follows:-

Clay < Silt < Sand < Gravel < Rock

Clay has the smallest size of particles (That is why, clay feels smooth). Silt has particles larger than that in clay. Sand particles can be seen easily. The size of particles is the largest in rocks.

2. How can a farmer convert an acidic soil to a neutral soil?

Ans: A farmer can convert an acidic soil into a neutral soil by "**liming the soil**". He can add a small quantity of quick lime or slaked lime solution to the soil. This will neutralise the acidic soil.

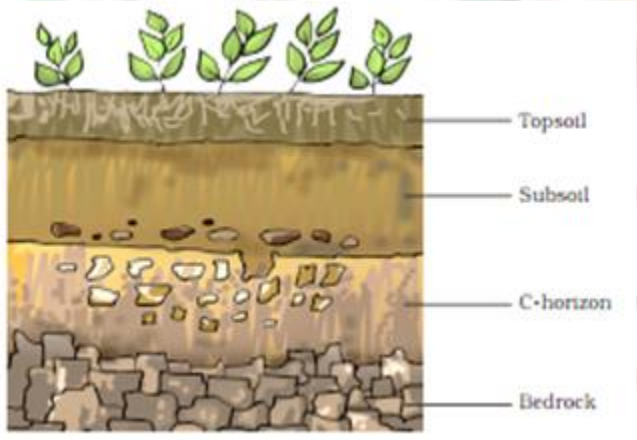
3. Is it a good practice to remove grass and small plants that are growing in an open, unused field? Give reason to support your answer.

Ans: No, it is not a good practice to remove grass and small plants that are growing in an open, unused field. Plants cover the soil surface and their roots bind the soil particles and hold them in place. They prevent soil erosion during strong winds and rains, and thereby protect the top soil.

4. A man digging a pit found that he could dig with ease initially but digging became difficult as he went deeper. He could not dig beyond a depth of five feet. Provide a suitable scientific explanation.

Ans: The soil surface has loose top soil which is easier to dig. At deeper layers, hard and partially weathered rocks or bedrocks are present which makes digging difficult.

5. Draw a label diagram of soil profile.



LONG ANSWER QUESTIONS

1. Continuously water-logged soils are disadvantageous for plant growth. Why?

Ans: Roots possess living cells that require oxygen for respiration and production of energy. They absorb oxygen present in the spaces between the soil particles. But in water-logged soils, water collects above the soil. The stagnant water occupies the spaces between the soil particles and pushes the oxygen

into the atmosphere. The roots are deprived of oxygen and this affects the growth of the roots and the plant. Thus, continuously water-logged soils are disadvantageous for plant growth.

2. Why is soil erosion relatively less in dense forests as compared to barren, open fields?

Ans: The tree cover (canopy) in dense forests prevents rain water from falling directly on the soil. The roots of the dense vegetation bind the soil particles and hold them together. As a result, soil erosion is minimised.

But in barren and open fields, the soil is exposed to the falling rain. The soil particles become loose due to the impact of the raindrops and the flow of water carries them away. The flowing water erodes the soil surface. Thus, the soil erosion is more.

3. Gardeners gently dig up the soil around the roots of garden herbs (plants) frequently. Give reasons.

Ans: Gardeners dig up the soil around the roots of garden herbs (plants) to facilitate:-

(a) Easy growth and expansion of the roots.

(b) Easier percolation of water through the soil.

(c) Aeration of soil so that air can move into the deeper layers of the soil.

(d) Removal of weeds.

EXERCISE :-

Tick the most suitable answer in questions 1 and 2.

Question 1. In addition to the rock particles, the soil contains

(i) air and water
(ii) water and plants.
(iii) minerals, organic matter, air and water.
(iv) water, air and plants.

Answer: (iii) minerals, organic matter, air and water.

Question 2. The water holding capacity is highest in

(i) sandy soil
(ii) clayey soil
(iii) loamy soil
(iv) mixture of sand and loam.

Answer: (ii) clayey soil.

Question 3. Match the items in Column I with those in Column II.

Column I	Column II
(i) A home of living organisms	(a) Large particles.
(ii) Upper layer of the soil	(b) All kinds of soil.
(iii) Sandy soil	(c) Dark in colour
(iv) Middle layer of the soil	(d) Small particles and packed tight.
(v) Clayey soil	(e) Lesser amount of humus.

Answer: (i) (b) (ii) (c) (iii)(a) (iv) (e) (v) (d)

Column I	Column II
(i) A home of living organisms	(b) All kinds of soil
(ii) Upper layer of the soil	(c) Dark in colour
(iii) Sandy soil	(a) Large particles.
(iv) Middle layer of the soil	(e) Lesser amount of humus.
(v) Clayey soil	(d) Small particles and packed tight

Question 4. Explain how soil is formed.

Answer: The soil is formed by the process of weathering in which the rocks break down by the action of wind, water and climate. It is a very slow process and big rocks get converted into soil.

Question 5. How is clayey soil useful for crops?

Answer: Clayey soil is very useful for crops because:

(i) It has very good water retaining capacity.
(ii) This soil is rich in humus and is very fertile.
(iii) It contains useful organic minerals. These properties of loamy soil is very suitable for growing crops.

Question 6. List the difference between clayey soil and sandy soil.

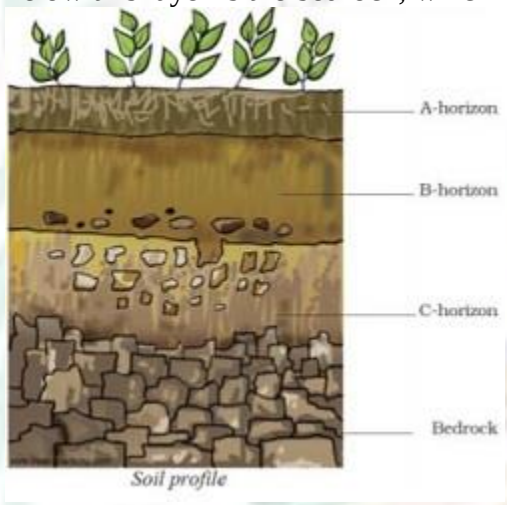
Answer:

Sandy soil	Clayey soil
(i) Proportion of fine particle is large.	(i) Proportion of big particle is large.
(ii) Has least percolation rate of water.	(ii) Has largest percolation rate of water.
(iii) Has good water holding capacity.	(iii) Has poor water holding capacity.

Question 7. Sketch the cross section of soil and label the various layers.

Answer: A vertical section through different layers of the soil is called the soil profile. Each layer differs in feel (texture), colour, depth and chemical composition. These layers are referred to as horizons.

1. The uppermost horizon is generally dark in colour as it is rich in humus and minerals. The humus makes the soil fertile and provides nutrients to growing plants. This layer is generally soft, porous and can retain more water. It is called the topsoil or the A-horizon.
2. The next layer has a lesser amount of humus but more of minerals. This layer is generally harder and more compact and is called the B-horizon or the middle layer.
3. The third layer is the C-horizon, which is made up of small lumps of rocks with cracks and crevices.
4. Below this layer is the bedrock, which is hard and difficult to dig with a spade



Soil profile

Question 8. Razia conducted an experiment in the field related to the rate of percolation.She observed that it took 40 min. for 200 ml of water to percolate through the soil sample.Calculate the rate of percolation.

Answer: Amout of percolate water = 200 ml
Time taken for percolation = 40 min
We know that,
Rate of percolation (ml / min) = Amount of waterPercolation timeAmount of waterPercolation time

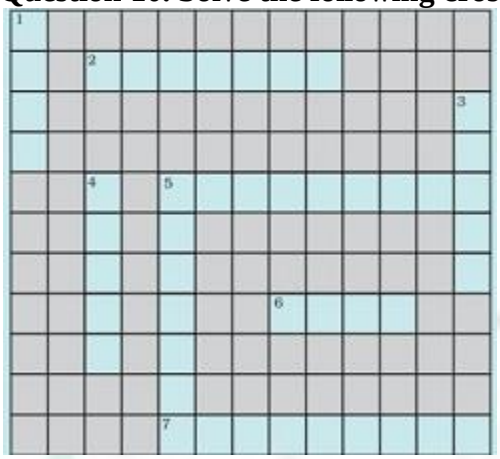
=200 ml40 min=5 ml/min=200 ml40 min=5 ml/min

Question 9. Explain how soil pollution and soil erosion could be prevented.

Answer: Steps for preventing soil pollution and soil erosion:

(i) Plantation should be encouraged because plant roots firmly bind the soil and help in preventing erosion.
(ii) Methods like crop rotation and mixed farming should be followed.
(iii) Use of organic fertilizers and manure instead of synthetic.
(iv) Pesticides and insecticides should be used in limited quantity and find natural way to prevent it.
(v) Plastic bags should b banned and it doesn't decompose and gives rise to soil pollution.
(vi) Industrial waste shouldn't be dumped directly as it kill necessary micro organisms of soil.

Question 10. Solve the following crossword puzzle with the clues given:



Across

2. Plantation prevents it.
5. Use should be banned to avoid soil pollution.
6. Type of soil used for making pottery.
7. Living organism in the soil.

Down

1. In desert soil erosion occurs through.
3. Clay and loam are suitable for cereals like.
4. This type of soil can hold very little water.
5. Collective name for layers of soil.

Answer: