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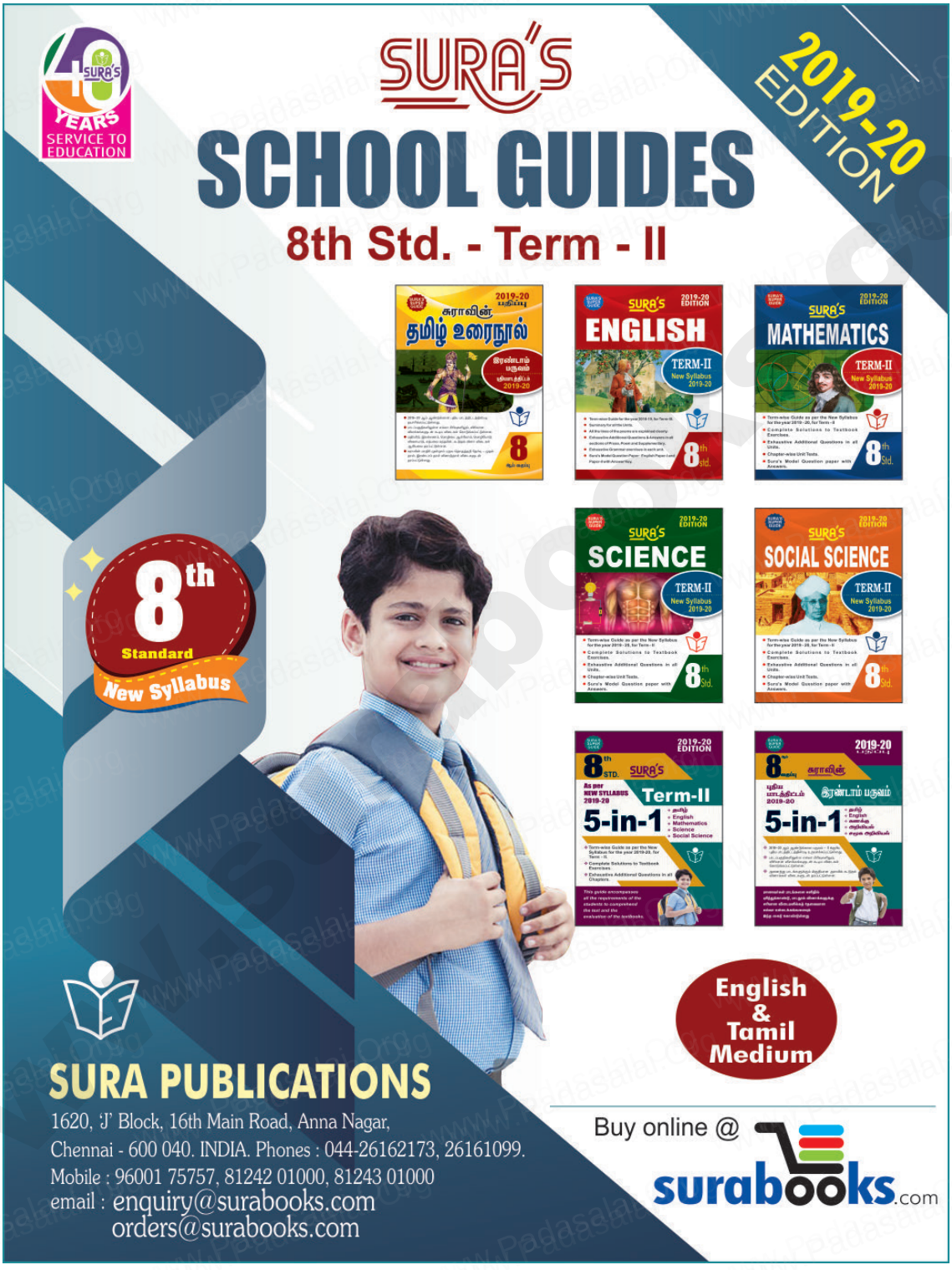
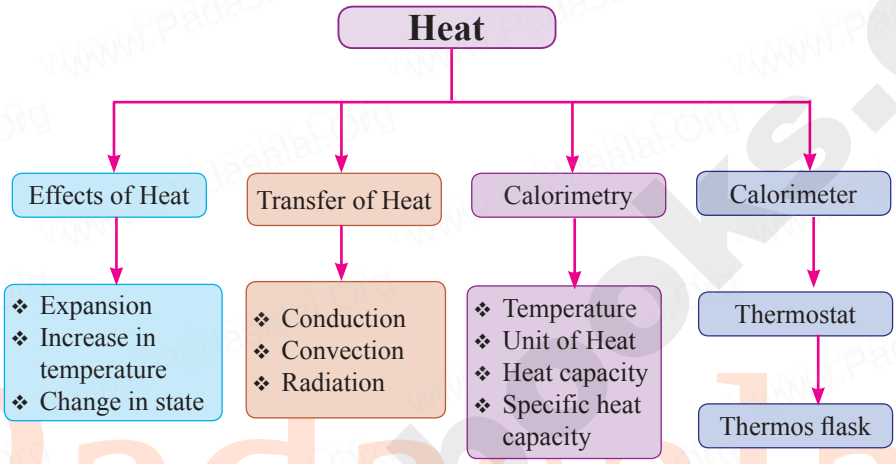


Unit 1

HEAT

Concept Map



Must Know Definitions

Heat	:	**Heat** is defined as energy which gets transferred from a higher temperature object to a lower temperature object.
Thermal energy	:	The temperature of a body is a measure of a body's average kinetic energy, which is also called **thermal energy**.
Units of heat	:	Since heat is a form of energy, its unit is the same as the unit of energy. (i.e.) joules. The SI unit of heat is joules (J). Another unit of heat bigger than joule is calorie.
One Calorie	:	**One calorie** is the amount of heat energy required to raise the temperature of 1 gram of water through 1°C.
One kilo Calorie	:	The amount of heat energy required to raise the temperature of 1 kg of water through 1°C. 1 kilo calorie = 4200 J (Approximately).
Heat capacity	:	**Heat capacity** is defined as the amount of heat energy required by a substance to raise its temperature by 1°C or 1 K. It is denoted by the symbol C'.
Specific Heat capacity	:	**Specific heat capacity** of a substance is defined as the amount of heat energy required to raise the temperature of 1 kilogram of a substance by 1°C or 1 K. It is denoted by the symbol C.
Calorimetry	:	The technique used to measure the amount of heat involved in a physical or a chemical process is known as **calorimetry**.

Calorimeter	:	A **calorimeter** is a device used to measure the amount of heat gained or lost by a substance.
Thermostat	:	A **thermostat** is a device which maintains the temperature of a place or an object constant.
Thermos Flask	:	The **thermos flask** (Vacuum flask) is an insulating storage vessel that keeps its content hotter or cooler than the surroundings for a longer time.

Formulae to remember

Heat capacity	:	$C' = \frac{Q}{\Delta T}\ Jk^{-1}$
Amount of heat energy	:	$Q = C' \times \Delta T\ J$
Specific of heat capacity	:	$C = \frac{Q}{m \times \Delta T}\ JKg^{-1}\ K^{-1}$

TEXT BOOK EXERCISES

I. Choose the best answer :

1. Heat is a form of _____.

(a) electrical energy (b) gravitational energy
(c) thermal energy (d) None of these

[Ans. (c) thermal energy]

2. If you apply some heat energy to a substance, which of the following can take place in it?

(a) Expansion (b) Increase in temperature
(c) Change of state (d) All the above **[Ans. (d) All the above]**

3. Which of the following substances will absorb more heat energy?

(a) Solid (b) Liquid (c) Gas (d) All the above

[Ans. (d) All the above]

4. If you apply equal amount of heat to a solid, liquid and gas individually, which of the following will have more expansion?

(a) Solid (b) Liquid (c) Gas (d) All of them

[Ans. (c) Gas]

5. The process of converting a liquid into a solid is called_____.

(a) sublimation (b) condensation
(c) freezing (d) deposition **[Ans. (c) freezing]**

6. Conduction is the heat transfer which takes place in a_____.

(a) solid (b) liquid (c) gas (d) All of them

[Ans. (a) solid]

➝ ACTIVITY - 5

Take some water in a vessel and heat it on a stove. Touch the surface of the water. It will be cold. Touch it after some time. It will be hot now. How did the heat which was supplied at the bottom reach the top?

Ans. **(i)** When water in the vessel is heated, water molecules at the bottom receive heat energy and move upward.
(ii) Then the molecules at the top comes down and get heated.
(iii) This kind of heat transfer is known as convection.

➝ ACTIVITY - 6

Take some amount of water and cooking oil in two separate vessels. Heat them till they reach a particular temperature (Caution: Heat the oil under the supervision of your teacher). Which one is heated first? Water will take more time to get heated. Why?

Ans. **(i)** Heat transfer depends on the nature of the substance.
(ii) Water has high specific heat capacity than that of cooking oil.
(iii) A substance with high specific heat capacity absorbs a large quantity of heat.
(iv) Thus, it takes long time to heat up.

★★★★★

Additional Questions

I. Choose the correct answer :

1. **1 calorie equals _____.**
(a) 0.42 J (b) 4.2 J (c) 420 J (d) 4200 J
[Ans. (b) 4.2 J]

2. **The SI unit of heat energy is _____.**
(a) joule (b) calorie
(c) kilo calorie (d) none of these
[Ans. (a) joule]

3. **Which of the following is not a scale of temperature?**
(a) Kelvin scale (b) Celsius scale (c) Richter scale (d) Fahrenheit scale
[Ans. (c) Richter scale]

4. **Convection of heat takes place in _____**
(a) liquids only (b) gases only (c) metals only (d) liquids and gases
[Ans. (d) liquids and gases]

5. **In solid substances, heat is transferred by**
(a) conduction (b) radiation
(c) convection (d) only a and b
[Ans. (b) radiation]

6. **In conduction, heat flows from _____**
(a) hotter to hotter region (b) colder to hotter region
(c) hotter to colder region (d) colder to colder region
[Ans. (c) hotter to colder region]

7. **Mud houses are cooler in summer and warmer in winter because**
(a) mud is a bad conductor of heat (b) mud is a good conductor of heat
(c) mud is a super conductor of heat (d) none
[Ans. (c) mud is a super conductor of heat]

2. **A body of mass 750 g requires 13,500 J of heat energy in order to raise its temperature from 25 ºC to 55 ºC. Calculate its specific heat capacity.**

Solution:

Given, m = 750 g = 0.750 kg

ΔT = (55 – 25) ºC = 30 ºC,

Q = 13,500 J

Q = $mC\Delta T$

or, C = $\frac{Q}{m\Delta T} = \frac{\overset{450}{\cancel{13,500}}}{0.750 \times \underset{1}{\cancel{30}}}$ = **600 JKg^{-1} $°C^{-1}$.**

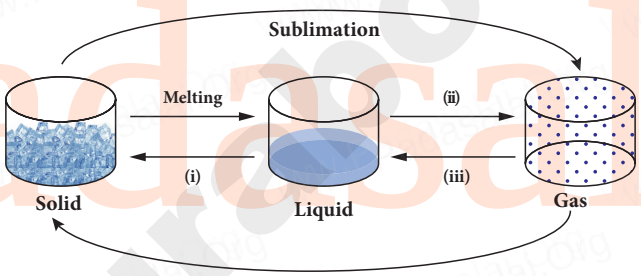
3. **An iron ball requires 9000 J heat energy to raise its temperature by 10ºC. Calculate the heat capacity of the iron ball.**

Solution:

Given, Q = 9000 J, ΔT = 10 ºC

Heat capacity, C = $\frac{Q}{\Delta T} = \frac{9000}{10}$ = 900 J $°C^{-1}$

IX. Picture based Questions:



Ans. **(i)** Freezing
(ii) Vapourisation
(iii) Condensation
(iv) Deposition

★★★★★

UNIT TEST

Time : 60 min. **Marks : 25**

I. Choose the correct answer: (3 × 1 = 3)

1. Convection of heat takes place in _____
(a) liquids only (b) gases only (c) metals only (d) liquids and gases

2. Heat is a form of _____.
(a) electrical energy (b) gravitational energy
(c) thermal energy (d) None of these

3. Which of the following substances will absorb more heat energy?
(a) Solid (b) Liquid (c) Gas (d) All the above

II. Fill in the blanks: **(4 × 1 = 4)**

4. The process of converting a substance from gas to solid is called_____.
5. The device which is used to measure the heat capacity of the liquid _____ .
6. If you apply heat energy, the temperature of a system will _____.
7. In vacuum, heat energy can travel by the process of _____.

III. Write True or False: **(3 × 1 = 3)**

8. The transfer of heat by radiation does not require any medium.
9. When ice changes into a liquid, it absorbs energy.
10. Water has the lowest specific heat capacity.

IV. Answer the following briefly : **(5 × 2 = 10)**

11. Write a note on convection.
12. What are the effects of heat?
13. You would have noticed some space being left in railway tracks. Why?
14. An iron ball requires 1000 J of heat to raise its temperature by 20°C. Calculate the heat capacity of the ball.
15. Can convection take place in solids? Why?

V. Answer in detail: **(1 × 5 = 5)**

16. Explain the working of thermos flask with a diagram.

(OR)

Distinguish between conduction, convection, and radiation.

★★★★★

Answer Key

I. 1. (d) liquids and gases 2. (c) thermal energy 3. (d) All the above

II. 4. deposition 5. Calorimeter 6. increase 7. radiation

III. 8. True 9. True 10. False

IV. 11. Refer Sura's Guide, Textbook Q. No. VI - 5

12. Refer Sura's Guide, Textbook Q. No. VI - 2.

13. Refer Sura's Guide, Additional Q. No. VI - 11

14. Refer Sura's Guide, Textbook Q. No. IX - 1.

15. Refer Sura's Guide, Additional Q. No. VI - 17.

V. 16. Refer Sura's Guide, Textbook Q. No. VII - 3.

(or)

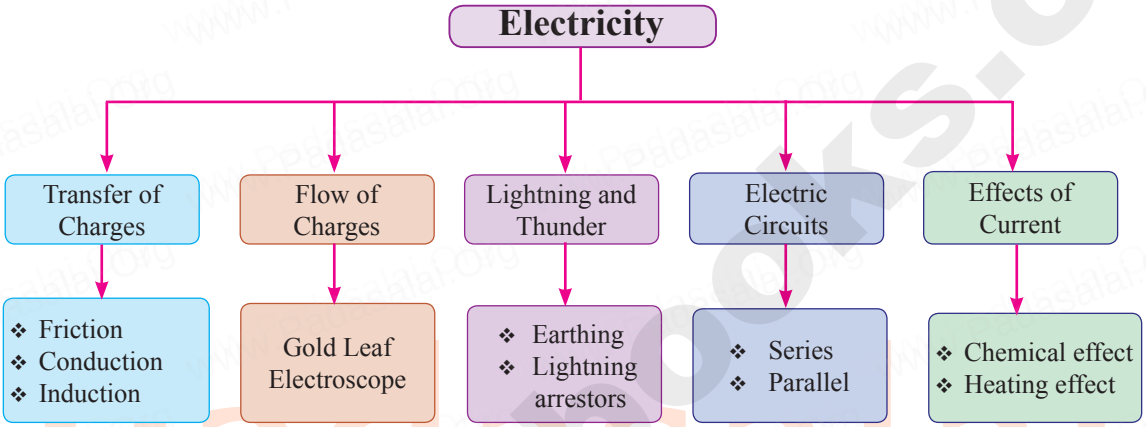
Refer Sura's Guide, Additional Q. No. VII - 3.

★★★★★

Unit 2

ELECTRICITY

Concept Map



Must Know Definitions

Electric charge	:	Charge or **electric charge** is the basic property of matter that causes objects to attract or repel each other.
Transfer of charges by friction	:	The process of charging an uncharged body by rubbing a charged body over the other.
Transfer of charges by conduction	:	Charges can be transferred to an object by bringing it in contact with a charged body. This method of transferring charges from one body to other body is called **transfer by conduction**.
Transfer of charges by induction	:	The process of charging an uncharged body by bringing a charged body near to it but without touching is called **induction**.
Electric current	:	The flow of electric charge per unit time is called **electric current**.
Conductors	:	The materials which allow electric charges to pass through them easily are called **conductors** of electricity.
Insulators	:	Materials which do not allow electric charges to pass through them easily are called **insulators**. Rubber, wood and plastic are insulators.
Ions	:	Electrically charged atoms or group of atoms.
Anode	:	The positive terminal of the battery is called **Anode**.
Cathode	:	The negative terminal of the battery is called **Cathode**.
Electrodes	:	The metal rods or plates through which the electric current enters or leaves an electrolyte are called **electrodes**.

Additional Questions

I. Choose the correct answer :

1. **Electroplating is based on _____effect of electricity.**
(a) magnetic (b) chemical (c) heating (d) physical
[Ans. (b) chemical]

2. **A positively charged object will attract _____charged object.**
(a) positively (b) negatively
(c) both a and b (d) none **[Ans. (b) negatively]**

3. **The method of charging an object by touching is called _____.**
(a) induction (b) diffusion (c) current (d) conduction
[Ans. (d) conduction]

4. **Lighting occurs due to _____.**
(a) rain (b) humidity (c) wind (d) electric discharge
[Ans. (d) electric discharge]

5. **Electric charge can be transferred from a charged object to another through _____.**
(a) vacuum (b) conductor
(c) air (d) insulator **[Ans. (b) conductor]**

6. **Electric charge is measured in _____.**
(a) volt (b) coulomb (c) ampere (d) watt
[Ans. (b) coulomb]

7. **The value of charge of an electron is equal to _____.**
(a) 6.04×10^{-19} C (b) 1.602×10^{-18} C
(c) 1.602×10^{-19} C (d) 6.10×10^{-18} C **[Ans. (c) 1.602×10^{-19} C]**

8. **Before using electroscope, it should be _____.**
(a) charged (b) closed (c) discharged (d) cleaned
[Ans. (c) discharged]

9. **Lighting rods are made of _____.**
(a) copper (b) plastic (c) sand paper (d) wood
[Ans. (a) copper]

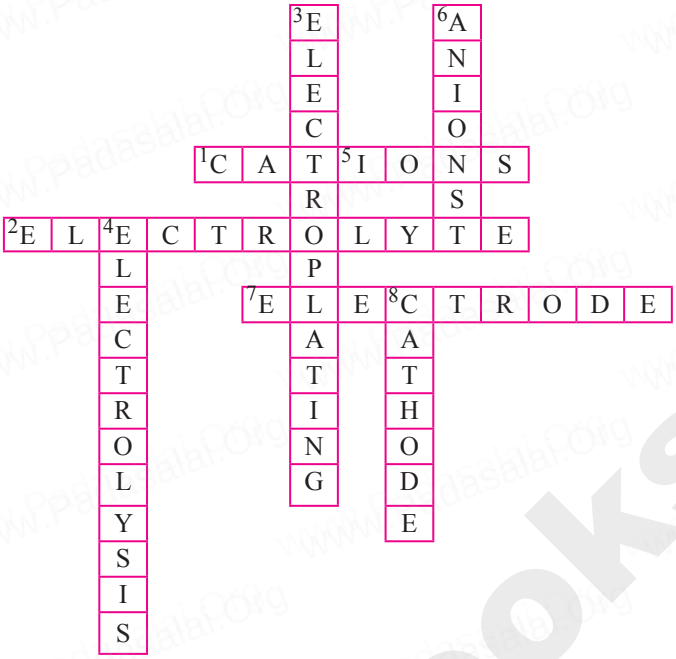
10. **Electricity produced on rubbing is _____.**
(a) static electricity (b) current electricity
(c) electromagnet (d) none **[Ans. (a) static electricity]**

11. **The materials which allows electric current to pass through it, is called _____.**
(a) conductor (b) insulator (c) both a and b (d) none of these
[Ans. (a) conductor]

12. **The material which does not allow electric current is called _____.**
(a) solution (b) metal (c) insulator (d) electrolyte
[Ans. (c) insulator]

13. **All metals are _____.**
(a) conductors (b) insulators (c) electrolytes (d) none
[Ans. (a) conductors]

Ans.



★★★★★

UNIT TEST

Time : 60 min. **Marks : 25**

I. Choose the correct answer: (3 × 1 = 3)

1. Fuse is
(a) a switch (b) a wire with low resistance
(c) a wire with high resistance
(d) a protective device for breaking an electric circuit

2. Electric charge is measured in _____
(a) Volt (b) Coulomb (c) ampere (d) watt

3. Which of the following a simple circuit must have?
(a) Energy Source, Battery, Load (b) Energy Source, Wire, Load
(c) Energy Source, Wire, Switch (d) Battery, Wire, Switch

II. Fill in the blanks. (4 × 1 = 4)

4. The body which has lost electrons becomes _____.

5. The flow of _____ per unit time is called current.

6. _____takes place by rubbing objects together.

7. Three bulbs are connected end to end from the battery. This connection is called _____.

III. Write True or False . **(3 × 1 = 3)**

8. The charge acquired by an ebonite rod rubbed with a piece of flannel is negative.
9. Water can conduct electricity.
10. Electroscope is a device used to charge a body by induction.

IV. Answer the following in one or two sentences: **(5 × 2 = 10)**

11. What is earthing?
12. Give some uses of electroplating.
13. What are anodes and cathodes?
14. How thunder takes place?
15. Write the differences between conductors and insulators.

V. Answer the following in detail: **(5 × 1 = 5)**

16. Distinguish between series and parallel circuit.

(or)

What is electroscope? Explain how it works?

★★★★★

Answer Key

I. 1. (d) a protective device for breaking an electric circuit
2. (b) coulomb 3. (d) Battery, Wire, Switch

II. 4. positive charged 5. Charge 6. Transfer of electron
7. series circuit

III. 8. True 9. True 10. True

IV. 11. Refer Sura's Guide, Textbook Q. No. VII - 2
12. Refer Sura's Guide, Textbook Q. No. VII - 5
13. Refer Sura's Guide, Additional Q. No. VI - 13
14. Refer Sura's Guide, Additional Q. No. VI - 18
15. Refer Sura's Guide, Additional Q. No. VI - 12.

V. 16. Refer Sura's Guide, Additional Q. No. VII - 5

(or)

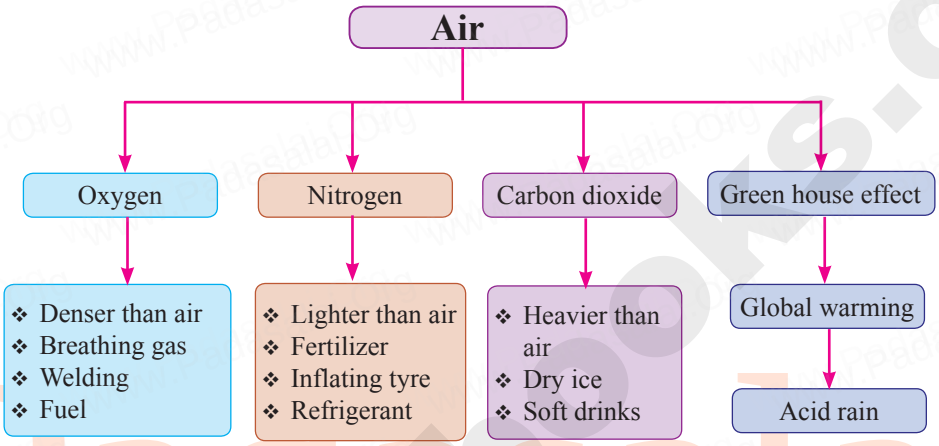
Refer Sura's Guide, Textbook Q. No. VIII - 2.

★★★★★

Unit 3

AIR

Concept Map



Must Know Definitions

Rusting	:	The process of conversion of iron into its hydrated form of oxide in the presence of air and moisture is called **rusting**.
Nitrogen fixation	:	The process that converts nitrogen in the air into a useful nitrogen compound is called the nitrogen **fixation**.
Sublimation	:	The process of conversion of solid into vapour without reaching liquid state is called **sublimation**.
Green house effect	:	Trapping of radiation from the sun by green house gases in the atmosphere that leads to rise in the earth's atmospheric temperature.
Haber's process	:	Synthesis of ammonia from nitrogen and hydrogen with the help of catalyst under 500 atm pressure and 550°C temperature.
Global warming	:	Global warming refers to an average increase in the temperature of the atmosphere or simply it is the warming of the earth.
Atmosphere	:	Gaseous jacket that surrounds the earth.
Soda water	:	Water produced when carbon dioxide is dissolved in water under pressure.
Air	:	**Air** is a mixture of gases that surrounds our planet earth.
Acid rain	:	Pollutants such as oxides of nitrogen and sulphur in the air released by factories, burning fossil fuels, eruption of volcanoes etc., dissolve in rain water and form nitric acid and sulphuric acid which adds up to the acidity of rain water. Hence, it results in **acid rain**.

TEXT BOOK EXERCISES

I. Choose the best answer :

1. Which of the following is true about oxygen?

(a) Completely burning gas (b) Partially burning gas
(c) Doesn't support burning (d) Supports burning

[Ans. (d) Supports burning]

2. Aerated water contains

(a) air (b) oxygen
(c) carbon dioxide (d) nitrogen **[Ans. (c) carbon dioxide]**

3. Solvay process is a method to manufacture

(a) lime water (b) aerated water
(c) distilled water (d) sodium carbonate

[Ans. (d) sodium carbonate]

4. Carbon dioxide with water changes

(a) blue litmus to red (b) red litmus to blue
(c) blue litmus to yellow (d) doesn't react with litmus

[Ans. (a) blue litmus to red]

5. Which of the following is known as azote?

(a) Oxygen (b) Nitrogen
(c) Sulphur (d) Carbon dioxide **[Ans. (b) Nitrogen]**

II. Fill in the blanks :

1. _____ is called as vital life. **[Ans. Oxygen]**
2. Nitrogen is _____ than air. **[Ans. lighter]**
3. _____ is used as a fertilizer. **[Ans. Nitrogen]**
4. Dry ice is used as a _____. **[Ans. refrigerant]**
5. The process of conversion of iron into hydrated form of oxides is called _____. **[Ans. rusting]**

III. Match the following :

1.	Nitrogen	-	Respiration in living animals
2.	Oxygen	-	Fertilizer
3.	Carbon dioxide	-	Refrigerator
4.	Dry ice	-	Fire extinguisher

Ans.

1.	Nitrogen	-	Fertilizer
2.	Oxygen	-	Respiration in living animals
3.	Carbon dioxide	-	Fire extinguisher
4.	Dry ice	-	Refrigerator

2. It is said that sleeping beneath the tree during night is bad for health. What is the reason?

Ans. During night trees absorb oxygen and release carbon dioxide. Therefore, anyone who sleeps under tree, will not get oxygen, which can cause breathing problems, suffocation etc.

3. Why does the fish die when it is taken out of water?

Ans. (i) Gills are richly supplied with blood capillaries and can readily absorb the oxygen dissolved in water.

(ii) When fishes are taken out of water, the supply of oxygen to the fishes is cut as the fishes cannot absorb and breathe using the oxygen present in the atmosphere.

(iii) Hence they die, when it is taken out of water.

4. How do astronauts breathe when they go beyond earth's atmosphere?

Ans. (i) Astronauts cannot breathe in space unless they carry their own oxygen with them.

(ii) They can make their own oxygen by using energy from the solar arrays to split hydrogen and oxygen from water.

Do you know?

Nowadays nitrogen is used as a substitute for compressed air in tyres. Have you noticed it? Why do people prefer nitrogen instead of compressed air in tyres?

Ans. It is because nitrogen tyres hold pressure longer as compared to compressed air. Nitrogen gas in the tyre escapes more slowly than compressed air does.

★★★★★

Additional Questions

AIR

I. Choose the correct answer :

1. _____ is necessary for all acids.

(a) Nitrogen (b) CO_2 (c) Oxygen (d) Hydrogen

[Ans. (c) Oxygen]

2. Tri oxygen molecule is known as _____.

(a) hydrogen (b) oxygen (c) nitrogen (d) ozone

[Ans. (d) ozone]

3. About 78% by volume of air is _____.

(a) Carbon dioxide (b) Nitrogen
(c) Argon (d) Oxygen **[Ans. (b) nitrogen]**

4. Carbon dioxide gas is _____

(a) heavier than air (b) lighter than air
(c) as heavy as air (d) none of these **[Ans. (a) heavier than air]**

5. A gas which neither burns nor supports burning is _____.

(a) Oxygen (b) Helium (c) Hydrogen (d) Carbon dioxide

[Ans. (d) Carbon dioxide]

6. A gas which is used to remove carbon impurities from steel.

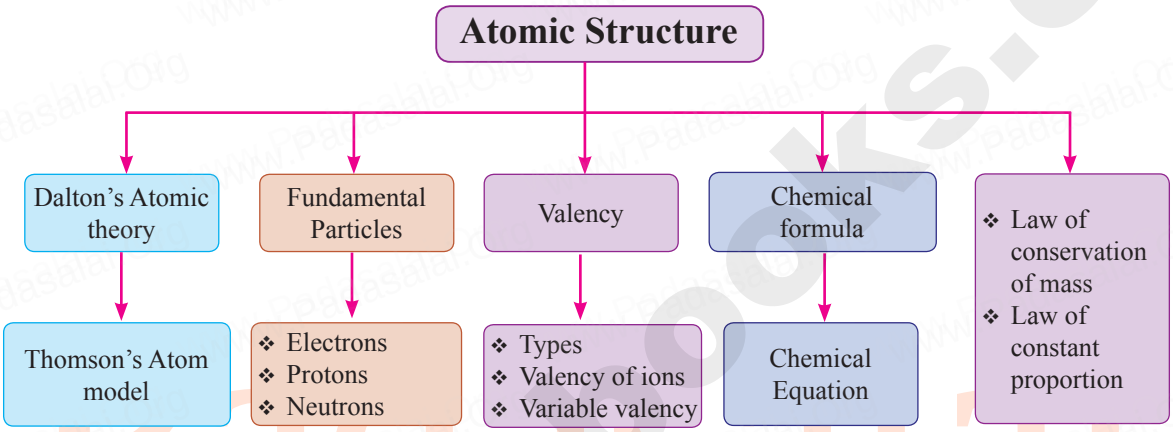
(a) Nitrogen (b) Oxygen (c) Carbon dioxide (d) Hydrogen

[Ans. (b) Oxygen]

Unit 4

ATOMIC STRUCTURE

Concept Map



Must Know Definitions

Valency	:	**Valency** is defined as the number of electrons lost, gained or shared by an atom in a chemical combination so that it becomes chemically inert.
Ions	:	Atoms which carry positive or negative charges are called **ions**.
Chemical formula or Molecular formula	:	Chemical formula is the shorthand notation of a molecule of a substance (compound). It shows the actual number of atoms of each element present in a molecule of a substance.
Molecule	:	A **molecule** is the smallest particle of an element or a compound that can normally exist independently.
Compound	:	The same elements chemically combined together in a fixed ratio is called a **compound**.
Chemical compound	:	A chemical compound is a substance formed out of more than one element joined together by chemical bond. Such compounds have properties that are unique from that of the elements that formed them.
Balanced chemical equation	:	A balanced chemical equation is one in which the total number of atoms of any element on the reactant side is equal to the total number of atoms of that element on the product side.

4. **Balance the following chemical equation.**

a) $Na + O_2 \rightarrow Na_2O$

b) $Ca + N_2 \rightarrow Ca_3N_2$

c) $N_2 + H_2 \rightarrow NH_3$

d) $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$

e) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$

Ans. a) $4Na + O_2 \longrightarrow 2Na_2O$

b) $3Ca + N_2 \longrightarrow Ca_3N_2$

c) $N_2 + 3H_2 \longrightarrow 2NH_3$

d) $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$

e) $2Pb(NO_3)_2 \longrightarrow 2PbO + 4NO_2 + O_2$

VI. Higher Order Thinking Questions :

1. **Why does a light paddle wheel placed in the path of cathode rays begin to rotate, when cathode rays fall on it?**

Ans. It is because the small particles of the cathode rays (electrons) have mass and energy. This energy is used in rotating the paddle wheels.

2. **How can we prove that the electrons carry negative charge?**

Ans. J.J. Thomson found that cathode rays were attracted by the positively charged plate and repelled by the negatively charged plate. This led him to the conclusion that the cathode rays (electrons) were made of negatively charged particles.

3. **Ruthresh, Hari, Kanishka and Thahera collected different samples of water from a well, a pond, a river and underground water. All these samples were sent to a testing laboratory. The test result showed the ratio of hydrogen to oxygen as 1:8.**

a) **What conclusion would you draw from the above experiment?**

b) **Which law of chemical combination does it obey?**

Ans. a) Water obtained from different sources like a well, a pond, a river and underground water will always consist of the same two elements hydrogen and oxygen in the ratio 1 : 8 by mass.

Ans. b) It obeys the law of constant proportion.

Intext Activities

→ ACTIVITY - 2

Classify the following ions into monovalent, divalent and trivalent.

Ni^{2+}, Fe^{3+}, Cu^{2+}, Ba^{2+}, Cs^{+}, Zn^{2+}, Cd^{2+}, Hg^{2+}, Pb^{2+}, Mn^{2+}, Fe^{2+}, Co^{2+}, Sr^{2+}, Cr^{3+}, Li^{+}, Ca^{2+}, Al^{3+}

Ans. Monovalent ions : Li^{+}, Cs^{+}

Divalent ions : Ni^{2+}, Cu^{2+}, Ba^{2+}, Zn^{2+}, Cd^{2+}, Hg^{2+}, Pb^{2+}, Mn^{2+}, Fe^{2+}, Co^{2+}, Ca^{2+}, Sr^{2+}

Trivalent ions : Fe^{3+}, Cr^{3+}, Al^{3+}

8. The smallest unit of an element that maintains the properties of an element.
10. A sub-atomic particle that has a positive electric charge.

Down :

2. A substance that cannot be broken down into simpler substance by chemical means.
4. The total number of protons and neutrons present in the nucleus of an atom.
9. An ion that has a negative charge.
11. A sub-atomic particle with a negative electric charge.
12. Positively charged ions.

Ans.

										[2]E														
								[6]V	A	L	E	N	C	Y										
				[12]C			[9]A			E														
			[4]M	A			N			M														
[1]S	U	B	A	T	O	M	I	C		E					[11]E									
			S	I	[10]P	R	O	T	O	N					L									
			S	O			N			T				[5]N	E	U	T	R	O	N				
			N	N											C									
			U												T									
			M												R									
			B										[8]A	T	O	M	[7]I	C	N	U	M	B	E	R
		[3]E	L	E	C	T	R	O	N	I	C	C	O	N	F	I	G	U	R	A	T	I	O	N
			R																					

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UNIT TEST

Time : 60 min. **Marks : 25**

I. Choose the correct answer: (3×1 = 3)

1. Cathode rays are made up of
(a) neutral particles (b) positively charged particles
(c) negatively charged particles (d) None of the above

2. The outer most shell of an atom is known as _____.
(a) valency (b) valence electron
(c) nucleus (d) valance shell

3. Isotopes exist because atoms of the same element can have different numbers of
(a) protons (b) neutrons (c) electrons (d) none

II. Fill in the blanks. (4 × 1 = 4)

4. _____ is the smallest particle of an element.
5. _____ is a negatively charged particle.
6. _____ have the same mass number but different atomic numbers.
7. The atomic theory was first proposed by _____.

III. Write True or False. If false write the correct statement. (3 × 1 = 3)

8. The combining capacity of an atom is called valency.
9. An atom has a number of orbits and each orbit has protons.
10. Helium has two electrons in the outermost orbit and so it is chemically inert.

IV. Answer the following in one or two sentences : (5 × 2 = 10)

11. State the Law of Conservation of Mass.
12. What is a chemical equation?
13. Write the names for the following compounds. a) Aluminium sulphate b) Silver nitrate
14. Write any two limitations of Dalton's atomic theory.
15. Draw a diagram to show the electronic configuration of sodium atom.

V. Answer the following in detail: (5 × 1 = 5)

16. (i) Balance the following chemical equation.
    a) $Na + O_2 \rightarrow Na_2O$ b) $Ca + N_2 \rightarrow Ca_3N_2$
    c) $N_2 + H_2 \rightarrow NH_3$ d) $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$
    e) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$

    (or)

    (ii) Write the main postulates of Dalton's Atomic theory.

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Answer Key

I. 1. (c) negatively charged particles
2. (d) valance shell
3. (b) neutrons

II. 4. Atom 5. Electron 6. Isobars 7. Dalton

III. 8. True
9. False. Correct statement: An atom has a number of orbits and each orbit has electrons.
10. True

IV. 11. Refer Sura's Guide, Textbook Q. No. IV - 1
12. Refer Sura's Guide, Textbook Q. No. IV - 6
13. a) $Al_2(SO_4)_3$, b) $AgNO_3$
14. Refer Sura's Guide, Additional Q. No. VI - 12
15. Refer Sura's Guide, Additional Q. No. VI - 20.

V. 16. (i) Refer Sura's Guide, Textbook Q. No. V - 4

(or)

(ii) Refer Sura's Guide, Additional Q. No. VII - 13.

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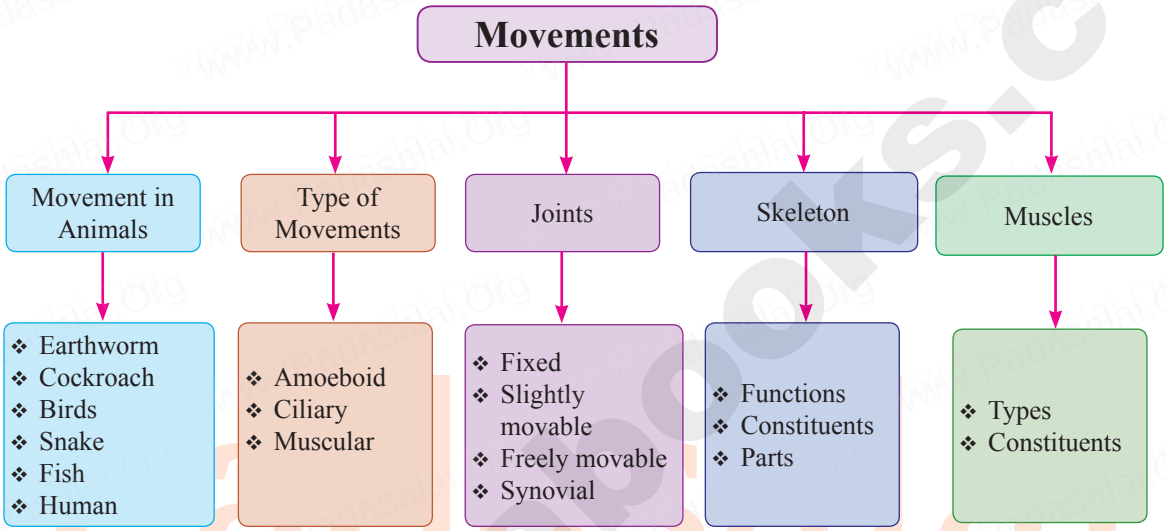
Unit 5

MOVEMENTS

Concept Map



Definitions

Movement	:	**Movement** is generally defined "as the act of changing the place or position by one or more parts of the body".
Skeleton	:	Our body is made up of a frame work of bones called **skeleton** which helps in the movement of the body.
Cilia	:	**Cilia** are the hairlike extensions of the epithelium.
Diarthrosis joint.	:	A synovial joint is a joint which makes connection between two bones consisting of a cartilage lined cavity filled with fluid, which is known as a **diarthrosis joint**.
Arthritis	:	The person feels acute pain in joints particularly while moving joints. This disease is referred to as **arthritis**.
Free-floating ribs	:	2 pairs of lower ribs are free in the front. These are called as **free-floating ribs**.
Knee cap	:	Knee is covered by a cap like structure called as patella or a **knee cap**.
Antagonistic	:	Muscles often work in pairs which work against each other. These are called **antagonistic** pairs.

TEXT BOOK EXERCISES

I. Choose the best answer :

1. Which of the following parts of our body help us in movement?

(i) Bones (ii) Skin (iii) Muscles (iv) Organs

Choose the correct answer from the options below.

(a) (i) and (iii) (b) (ii) and (iv) (c) (i) and (iv) (d) (iii) and (ii)

[Ans. (a) (i) and (iii)]

2. Which one of the following organisms lack muscles and skeleton for movement?

(a) Dog (b) Snail (c) Earthworm (d) Human being

[Ans. (b) Snail]

3. _____ joints are immovable.

(a) Shoulder and arm (b) Knee and joint

(c) Upper jaw and skull (d) Lower jaw and upper jaw

[Ans. (c) Upper jaw and skull]

4. Why do underwater divers wear fin-like flippers on their feet ?

(a) To swim easily in water. (b) To look like a fish.

(c) To walk on water surface. (d) To walk over the bottom of the sea (sea bed).

[Ans. (a) To swim easily in water]

5. External ear (pinna) is supported by

(a) bone (b) cartilage (c) tendon (d) capsule

[Ans. (b) cartilage]

6. Cockroach moves with the help of its

(a) leg (b) bone (c) muscular foot (d) whole body

[Ans. (d) whole body]

7. Which one of the following categories of vertebrae are correctly numbered?

(a) Cervical-7 (b) Thoracic-10 (c) Lumbar - 4 (d) Sacral - 4

[Ans. (a) Cervical-7]

II. Fill in the blanks :

1. Movement of organisms from place to place is called _____. **[Ans. locomotion]**
2. _____ refers to change in position of the part of an organisms body. **[Ans. Movement]**
3. A structure which provides rigid frame work to the body is called _____ **[Ans. skeleton]**
4. Axial skeleton in human consists of _____, _____, _____ and _____. **[Ans. Skull, facial bones, sternum, ribs, vertebral column]**
5. Appendicular skeleton in human consists of _____ and _____. **[Ans. Pelvic, Pectoral girdle]**
6. The place where two bones meet is termed as _____. **[Ans. Joint]**

Additional Questions

I. Choose the correct answer :

1. Gliding allows _____.
(a) movement in two planes (b) movement in three planes
(c) movement in one plane (d) no movement
[Ans. (b) movement in three planes]

2. The greatest range of movement is seen in _____ joint.
(a) saddle (b) hinge
(c) ball and socket (d) pivot **[Ans. (c) Ball and socket]**

3. The wrist bones are examples of _____ joint.
(a) condyloid (b) saddle (c) gliding (d) hinge
[Ans. (a) condyloid]

4. There are _____ types of movable joints.
(a) 4 (b) 3 (c) 5 (d) 6 **[Ans. (d) 6]**

5. _____ is a immovable joint.
(a) Skull (b) Lower jaw
(c) Spine (d) Inner ear **[Ans. (a) Skull]**

6. The _____ is the strongest bone of human skeleton.
(a) femur (b) skull
(c) vertebrae (d) ribs **[Ans. (a) Femur]**

7. Flat bones are seen in _____ .
(a) legs (b) spine
(c) shoulder (d) wrist ankle **[Ans. (c) shoulder]**

8. Irregular bones are seen in _____ .
(a) legs (b) skull
(c) vertebral column (d) ribs **[Ans. (c) vertebral column]**

9. Phalanges refer to bones of the _____ .
(a) ankle (b) toes
(c) wrist (d) knee **[Ans. (b) toes]**

10. _____ is not a characteristic of cardiac muscle.
(a) Branched (b) Multinucleate
(c) Involuntary (d) Smooth muscle **[Ans. (d) Smooth muscle]**

11. _____ is not found in arm bone.
(a) Radius (b) Humerus
(c) Patella (d) Carpals **[Ans. (c) Patella]**

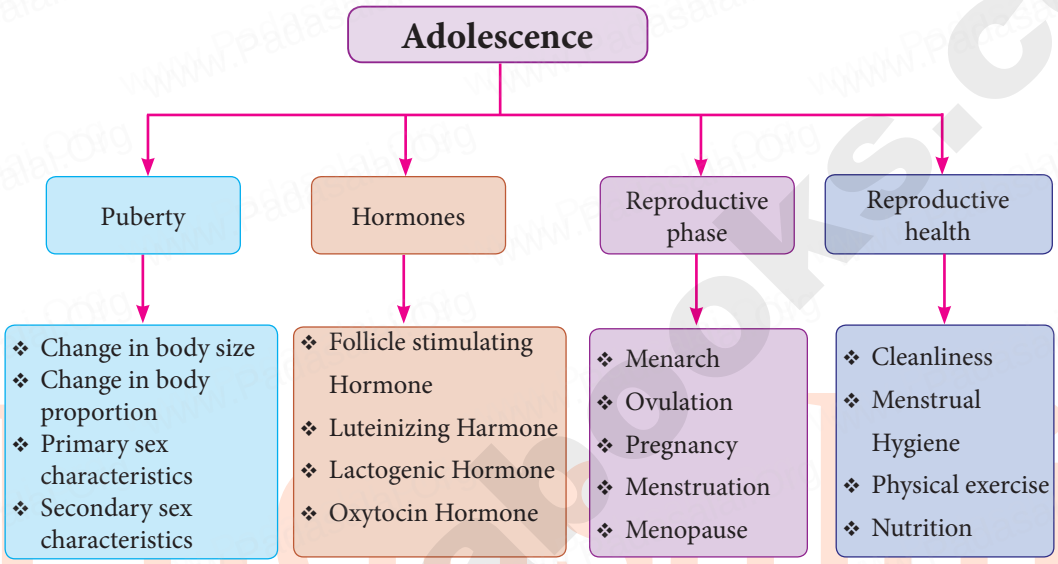
12. The hardest working muscle is found in the _____ .
(a) skull (b) eye
(c) thigh (d) rib cage **[Ans. (b) Eye]**

13. _____ is a bundle of contractile tissue.
(a) Bone (b) Skeleton (c) Muscle (d) Joint
[Ans. (c) Muscle]

Unit 6

REACHING THE AGE OF ADOLESCENCE

Concept Map



Definitions

Development	:	Maturity along with experiences produces a progressive series of changes in an organism. These series of changes are called **development**.
Developmental stages	:	Different phases of human development are called **developmental stages**.
Teenage	:	Period starts at the age of about 10 to 13 and ends at the age of 19.
Puberty	:	**Puberty** is a period of few years in which rapid physical; physiological and psychological changes occur resulting in sexual maturity.
Reproductive phase	:	The phase in an individual's life during which there is production of gametes is called **reproductive phase**.
Menarche	:	The first menstrual flow begins at puberty and is termed **menarche**.
Menopause	:	Stoppage of menstruation is termed as **menopause**.
Ovulation	:	The release of ovum from the ovary is called **ovulation**.

Menstruation	:	The thick and soft inner lining of uterus along with the blood vessels and the dead ovum comes out of the vagina in the form of bleeding called **menstruation**.
Adolescence	:	**Adolescence** is the period of reproductive maturity which lies usually between the ages of 11 to 19 years.
Hormones	:	**Hormones** are the secretions of endocrine glands without ducts which secrete them directly into the bloodstream.

TEXT BOOK EXERCISES

I. Choose the best answer :

1. **Adolescence is the period of life between _____ years of age.**
(a) 10 to 16 (b) 11 to 17 (c) 11 to 19 (d) 11 to 20
[Ans. (c) 11 to 19]

2. **The period at which an organism attains sexual maturity is called _____**
(a) puberty (b) adolescence (c) growth (d) maturity
[Ans. (a) puberty]

3. **During puberty, the region below the waist become wider in _____.**
(a) boys (b) girls (c) Both a and b (d) None of these
[Ans. (c) Both a and b]

4. **Adam's apple is the growth of the _____**
(a) pharynx (b) thyroid
(c) larynx (d) parathyroid **[Ans. (c) larynx]**

5. **Many adolescent boys and girls get pimples on face, due to the secretions of _____ gland.**
(a) sweat (b) sebaceous
(c) sweat and sebaceous (d) None of these **[Ans. (b) sebaceous]**

6. **The sperm is produced by _____**
(a) penis (b) ovary (c) uterus (d) testes **[Ans. (d) testes]**

7. **_____ are the chemical substances, secreted by endocrine glands.**
(a) Hormones (b) Enzymes (c) Proteins (d) Fatty acids
[Ans. (a) Hormones]

8. **Androgen production is regulated by _____.**
(a) GH hormone (b) LH hormone (c) TSH hormone (d) ACTH hormone
[Ans. (b) LH hormone]

9. **During menstruation, the progesterone level is _____.**
(a) decreased (b) increased (c) ceased (d) normal
[Ans. (a) ceased]

10. **_____ intake needs to be increased to prevent osteoporosis in later life.**
(a) Potassium (b) Phosphorus (c) Iron (d) Calcium
[Ans. (d) Calcium]

(vii) If you want to taste the food, use a clean spoon.
(viii) Change your clothes regularly and wash them cleanly, especially undergarments.
(ix) Do not defecate in open field. Use clean toilets for defecation.
(x) If you are not well, avoid self-medication, consult a doctor.
(xi) In case of girls, menstrual hygiene can be explained to them.

2. Adolescence is the energistic stage. What health and good habits you want to develop?

Ans. Healthy and good habits that we should develop during adolescence are:
(i) Eat balanced diet and avoid junk food to prevent obesity.
(ii) Regular physical exercise which helps to build our body.
(iii) Keep ourselves clean by bathing twice a day, cutting hair, trimming nails, wearing clean cloths.
(iv) Keep away from abusive substances, drugs smoking and any other bad habits.
(v) Observe menstrual hygiene.
(vi) Be aware of problems related to adolescence and take care of one's physical and mental health.

★★★★★

Additional Questions

I. Choose the correct answer :

1. _____ is not a source of iron.
(a) Gooseberry (b) Fish (c) Milk (d) Jaggery
[Ans. (c) Milk]

2. FSH is produced by _____.
(a) pituitary gland (b) thyroid gland
(c) uterus (d) testes **[Ans. (a) pituitary gland]**

3. ICSH refers to _____.
(a) FSH (b) LH (c) oxytocin (d) testosterone
[Ans. (b) LH]

4. Menstruation normally occurs once in _____.
(a) 25 days (b) 35 days (c) 28 days (d) 19 days
[Ans. (c) 28 days]

5. Normally pregnancy lasts for _____ days.
(a) 300 (b) 280 (c) 320 (d) 260 **[Ans. (b) 280]**

II. Fill in the Blanks :

1. Oil glands are called _____ glands. **[Ans. sebaceous]**
2. The primary sex organs of the male and female are called _____ and _____ respectively. **[Ans. Testes, ovary]**
3. _____ hormone stimulates the testes to produce androgens. **[Ans. Leutinizing]**
4. _____ is the male sex hormone. **[Ans. Androgen]**
5. The hormone _____ is involved in the contraction of uterine muscles during child birth. **[Ans. oxytocin]**
6. The release of ovum from the ovary is called _____. **[Ans. ovulation]**
7. The wall of _____ becomes thick to receive the fertilized egg. **[Ans. uterus]**

VI. Answer in detail : :

1. Explain the Secondary sex characteristics of Boys.

Ans. The following are the secondary sex characteristics of boys.

(i) **Hair :** Immediately after the development of primary sex characteristics, pubic hair appears followed by axillary and facial hair.

(ii) **Skin :** The skin becomes coarse and the pores in the skin enlarge.

(iii) **Glands :** The oil producing glands in the skin enlarge and due to this acne may appear on the faces.

(iv) **Muscle :** The strength of the muscle increases and it gives shape to arms, legs and shoulders.

(v) **Voice :** During this period voice changes occur and the voice becomes husky. Then its pitch drops and the volume increases.

2. Explain the Secondary sex characteristics of Girls.

Ans. Girls show the following secondary sex characteristics at the time of puberty.

(i) **Hips :** Due to the enlargement of the pelvic bone and the development of subcutaneous fat, the hip becomes wider and rounder.

(ii) **Breast :** After the enlargement of hips, the breasts begin to develop during this time.

(iii) **Hair :** Pubic hair appears followed by axillary and body hair on the limbs.

(iv) **Skin :** The skin becomes coarser and the pores enlarge as in the case of boys.

(v) **Gland :** Oil producing glands become active causing acne on the face.

(vi) **Muscles :** Increase in muscles takes place which gives shape to shoulders, arms and legs.

(vii) **Voice :** Voice becomes shrill and voice breaks are rare among girls.

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UNIT TEST

Time : 60 min. **Marks : 25**

I. Choose the correct answer: (3×1 = 3)

1. Adam's apple is the growth of the _____

(a) pharynx (b) thyroid (c) larynx (d) parathyroid

2. The period at which an organism attains sexual maturity is called _____

(a) puberty (b) adolescence (c) growth (d) maturity

3. _____is not a source of iron.

(a) Gooseberry (b) Fish (c) Milk (d) Jaggery

II. Fill in the blanks : (3 × 1 = 3)

4. The male and the female gamete fuse together and form _____.

5. _____ is secreted by the ovaries of female.

6. Oil glands are called _____ glands.

III. True or False if false correct the statement : **(3 × 1 = 3)**

7. The male sex hormone is called androgen.
8. Corpus luteum gross during menstruation.
9. Egg is released from fallopian tube.

IV. Answer the following (any 5): **(5 × 1 = 5)**

10.

1.	Calcium	(a)	Salt
2.	Iron	(b)	Fruits
3.	Iodine	(c)	Jaggery
4.	Minerals	(d)	Pulses
5.	Protein	(e)	Milk

V. Answer the following (any 3): **(3 × 2 = 6)**

11. Define Ovulation.
12. Suggest 4 steps to maintain personal hygiene.
13. Name the sex organs and their hormones.
14. What is menopause?
15. How is adolescence differ from childhood?

V. Answer in detail: **(5 × 1 = 5)**

16. (a) Explain menstrual cycle.

(or)

(b) What are the physical changes that occur in boys and girls during adolescence?

★★★★★

Answer Key

I. 1. (c) larynx 2. (a) puberty 3. (c) Milk

II. 4. zygote 5. Estrogen 7. sebaceous

III. 7. False. **Correct statement :** The male sex hormone is called androgen.
8. False. **Correct statement :** Corpus luteum degenerates during menstruation
9. False. **Correct statement :** Egg is released from ovary.

IV. 10. [1 - e. 2 - c, 3 - a, 4 - b, 5 - d]

V. 11. Refer Sura's Guide, Additional Q. No. V - 3.
12. Refer Sura's Guide, Textbook HOTS Q. No. VII - 1
13. Refer Sura's Guide, Additional Q. No. V - 1.
14. Refer Sura's Guide, Additional Q. No. V - 5.
15. Refer Sura's Guide, Textbook Q. No. V - 8

V. 16. a) Refer Sura's Guide, Textbook Q. No. VI - 3.

(or)

b) Refer Sura's Guide, Textbook Q. No. VI - 1.

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Unit 7

DIGITAL PAINTING

TEXT BOOK EXERCISES

I. Choose the correct answer. :

1. Tux paint software is used to _____

(a) Paint (b) Program (c) Scan (d) PDF **[Ans. (a) Paint]**

2. Which toolbar is used for drawing and editing controls in tux paint software?

(a) Left Side: Toolbar (b) Right side : Toolbar
(c) Middle : Tool bar (d) Bottom : Tool bar

[Ans. (a) Left Side: Toolbar]

3. What is the shortcut key for undo option?

(a) Ctrl + Z (b) Ctrl + R
(c) Ctrl + Y (d) Ctrl +N **[Ans. (a) Ctrl + Z]**

4. Tux Math software helps in learning the _____

(a) Painting (b) Arithmetic
(c) Programming (d) Graphics **[Ans. (b) Arithmetic]**

5. In Tux Math, Space cadet option is used for _____.

(a) Simple addition (b) Division
(c) Drawing (d) Multiplication

[Ans. (a) Simple addition]

II. Answer the following Questions:

1. What is Tux Paint ?

Ans. Tux Paint is a free drawing program designed for young children.

2. What is the use of Text Tool ?

Ans. Text tool is used to type texts.

3. What is the Shortcut key for Save option?

Ans. Ctrl + S

4. What is Tux Math?

Ans. Tux Math is an open source arcade – style video game for learning arithmetic.

5. What is the use of Ranger?

Ans. Ranger is used to do addition, subtraction, multiplication and division to ten.

Additional Questions

I. Choose the correct answer.

1. Which tool is used to open an existing file?

(a) Line (b) Open
(c) New (d) Undo

[Ans. (b) Open]

2. What is the shortcut key for print option?

(a) Ctrl + S (b) Ctrl + O
(c) Ctrl + P (d) Ctrl + Y

[Ans. (c) Ctrl + P]

3. In tux paint scout option is used for _____.

(a) Simple addition (b)Addition and subtraction to ten
(c) Division (d) Multiplication

[Ans. (b) Addition and subtraction to ten]

4. Which tool is used to cancel a command given earlier?

(a) Quit (b) magic
(c) eraser (d) undo

[Ans. (d) undo]

5. Which tool is like a rubber stamps or stickers?

(a) text (b) stamp (c) eraser (d) magic

[Ans. (b) stamp]

II. Fill in the Blanks.

1. When Tux paint first loads, a _____ screen will appear. **[Ans. title / credits]**
2. The _____ tool helps us to draw freehand drawings. **[Ans. paint brush]**
3. The _____ tool is used to draw lines. **[Ans. line]**
4. _____ tool has a set of special tools. **[Ans. Magic]**
5. Clicking the _____ button will start a new drawing. **[Ans. New]**

III. Question and answers:

1. What is the use of shapes tool?

Ans. Shape tool is used to draw some simple filled and un-filled shapes.

2. What is play Arcade Game?

Ans. This option is used to select and play one of the four open ended "arcade style" games.

3. Which tool is used to closed Tux Paint window?

Ans. Quit tool is used to close Tux Paint window.

4. What is the use of selector?

Ans. Selector display the options associated with the specific tool.

5. What is help area?

Ans. Help area is in the bottom of the screen. It provides tips and other information while you draw.