1 CHEMICAL REACTIONS AND EQUATIONS

TOPIC-1
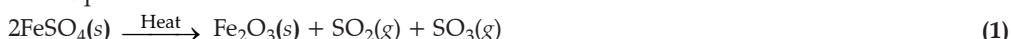## Chemical Reactions and Equations

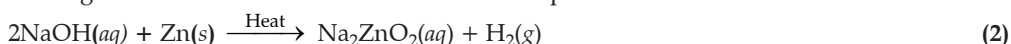**SUMMATIVE ASSESSMENT**   **WORKSHEET-1**

Ans. 1 : Rusting of Iron. **(1)**

Ans. 2 : Balanced Equation

$$2FeSO_4(s) \xrightarrow{\text{Heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g)$$ **(1)**

Ans. 3 : When zinc glanules as heated with NaOH solution the product sodium zincate is formed :

$$2NaOH(aq) + Zn(s) \xrightarrow{\text{Heat}} Na_2ZnO_2(aq) + H_2(g)$$ **(2)**

Ans. 4 : Blue colour changes to light green. Reddish brown deposit on the iron nail is formed.
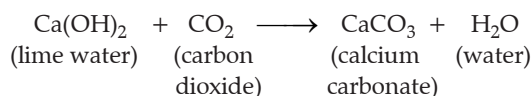
$$Fe\,(s) + CuSO_4\,(aq) \longrightarrow FeSO_4(aq) + Cu(s)$$ **1+1=2**

Ans. 5 : Baking powder ($NaHCO_3$), salt X is commonly used in bakery products. On heating, it forms sodium carbonate (Na_2CO_3), y and CO_2 gas; Z is evolved. When CO_2 gas is passed through lime water it forms calcium carbonate ($CaCO_3$), which is slightly soluble in water making it milky. **1½**

$$X – NaHCO_3 ; Y – Na_2CO_3; Z – CO_2 \text{ gas}$$

$$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + H_2O + CO_2$$

$$Na_2CO_3.10H_2O \xrightarrow{\text{Heat}} Na_2CO_3 + 10H_2O$$

½+½+½
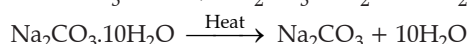
Ans. 6 : (a) Substance X is lime water.

$$Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$$
(lime water)   (carbon   (calcium   (water)
           dioxide)   carbonate)
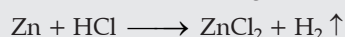
(b) Calcium oxide reacts vigorously with water to produced slaked lime (calcium hydroxide) releasing a large amount of heat.

$$CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2\,(aq)$$
(quick lime)   (slaked lime) **(3)**
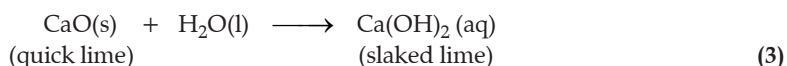
Ans. 7 : (a) With dil H_2SO_4 : H_2 gas is evolved.
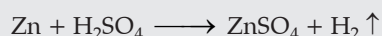
$$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2 \uparrow$$
(b) With dil HCl : H_2 gas is evolved.

$$Zn + HCl \longrightarrow ZnCl_2 + H_2 \uparrow$$
(c) With dil HNO_3 : N_2O gas is evolved.

$$4Zn + 10HNO_3 \longrightarrow 4Zn(NO_3)_2 + 5H_2O + N_2O$$
(d) With dil NaCl : No chemical reaction takes place.
(e) With dil NaOH : Salt is formed and H_2 gas is evolved.
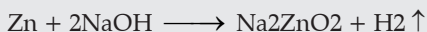
$$Zn + 2NaOH \longrightarrow Na2ZnO2 + H2 \uparrow$$ **[CBSE Marking Scheme, 2013] 1×5 = 5**

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SUMMATIVE ASSESSMENT   **WORKSHEET-2**

Ans. 1 : $ZnO(s)$ and $CO_2(g)$ are formed.
Chemical Equation :

$$ZnCO_3 \xrightarrow{\text{Heat}} ZnO + CO_2$$

½+½

Ans. 2 : $Pb\,(NO_3)_2 + 2KI \longrightarrow 2KNO_3 + PbI_2$
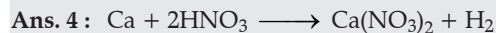(Lead   (Potassium   (Potassium (Lead
nitrate)   iodide)   nitrate)   iodide) **(1)**

Ans. 3 : Balanced Chemical Equations :

(i) $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$

(ii) $BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + 2NaCl$ **1+1**

Ans. 4 : $Ca + 2HNO_3 \longrightarrow Ca(NO_3)_2 + H_2$
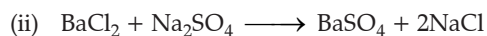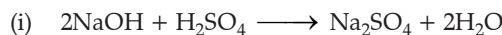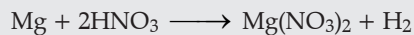
$Mg + 2HNO_3 \longrightarrow Mg(NO_3)_2 + H_2$ **[CBSE Marking Scheme, 2013] 1+1**

Ans. 5 : (a) Exothermic Reaction

$CaO + H_2O \longrightarrow Ca(OH)_2$

(b) Double displacement reaction.

$BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + NaCl$ **[CBSE Marking Scheme, 2015] 1½ + 1½**

Ans. 6 : $N_2 + H_2 \longrightarrow NH_3$ (Unbalanced equation).

(i) Examine the number of atoms of different elements present in the unbalanced equation.

(ii) In the above reaction both the sides N_2 and H_2 both are unbalanced.

(iii) To balance hydrogen, H_2 is multiplied by 3 on both the sides. It makes 6H-atoms on the left hand side.

(iv) Now to balance hydrogen atoms on the right hand side NH_3 should be multiplied by 2. It make 6H-atoms on this side.

(v) Now to balance nitrogen atoms, they are counted separately for both the sides and we will find that, nitrogen atoms are 2 on both left hand side and right hand side.

(vi) Balanced chemical equation will be :

$N_2 + 3H_2 \longrightarrow 2NH_3$ **½+½+½+½+½+½**
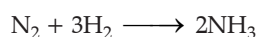
Ans. 7 : (i) Shivam had spicy food, so he was suffering from acidity. **1**

(ii) Antacids are alkaline in nature, so when Shivam took a spoon of antacid it neutralized the acid. The type of reaction is Neutralisation reaction. **2**

(iii) Friendship, concern for each other, value and balanced diet. **2**

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SUMMATIVE ASSESSMENT   WORKSHEET-3

Ans. 1 : Quick lime reacts with water vigorously to produce slaked lime and a large amount of heat.
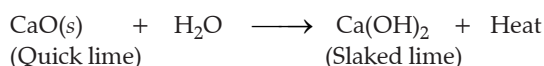
$CaO(s)$ + $H_2O \longrightarrow Ca(OH)_2$ + Heat
(Quick lime)   (Slaked lime) **1**

Ans. 2 : Law of conservation of mass.

Mass can neither be created nor be destroyed during a chemical reaction. **½+½**

Ans. 3 : (i) $2AgBr(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Br_2(g)$ **1**
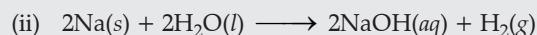
(ii) $2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$ **[CBSE Marking Scheme, 2012] 1**

Ans. 4 : Magnesium combines with atmospheric oxygen to form magnesium oxide

$2Mg + O_2 \longrightarrow 2MgO$ **[CBSE Marking Scheme, 2012] 2**

Ans. 5 : (i) $Na_2CO_3(s) + 2HCl(aq) \longrightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

(ii) $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq) + Heat$
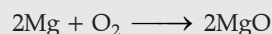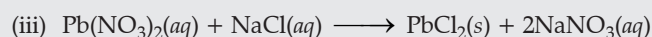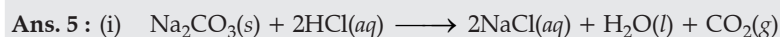
(iii) $Pb(NO_3)_2(aq) + NaCl(aq) \longrightarrow PbCl_2(s) + 2NaNO_3(aq)$
[CBSE Marking Scheme, 2014] 1+1+1

Ans. 6 : (i) Change in colour : Reaction between lead nitrate solution and potassium iodide solution.

$Pb(NO_3)_2(aq) + 2KI \longrightarrow PbI_2(s) + 2KNO_3(aq)$
In this reaction, colour changes from colourless to yellow.

(ii) Change in temperature : Action of dil. sulphuric acid on zinc.

$$Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2$$

(iii) Formation of precipitate : Action of barium chloride on sodium sulphate.

$$BaCl_2(aq) + Na_2SO_4(aq) \longrightarrow BaSO_4(s) + 2NaCl(aq)$$ **[CBSE Marking Scheme, 2014] 1+1+1**

Ans. 7 : (i) $2NaOH(aq) + Zn(s) \longrightarrow Na_2ZnO_2(aq) + H_2(g)$

(ii) $Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O$

(iii) $Na_2CO_3 + H_2SO_4(dil) \longrightarrow Na_2SO_4(aq) + H_2O(l) + CO_2(g)$

(iv) $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$

(v) $CuO + 2HCl\ (dil) \longrightarrow CuCl_2 + H_2O$ **1+1+1+1+1**

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TOPIC-2
Types of Chemical Reactions–Corrosion and Rancidity

SUMMATIVE ASSESSMENT   WORKSHEET-4

Ans. 1 : They get tarnished by reacting with atmospheric air to form silver sulphide.   **1**

Ans. 2 : To prevent the oil and fats of the chips from being oxidized or becoming rancid.   **1**
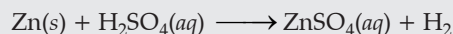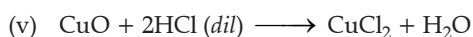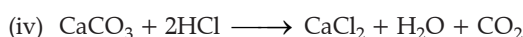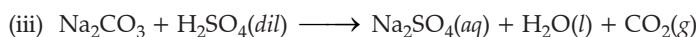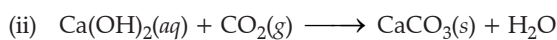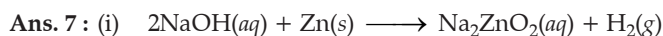
Ans. 3 : Copper sulphate — Green
Ferrous sulphate — Pale green
Sodium sulphate — Milky white
Barium chloride — White   **½ + ½ + ½ + ½**

Ans. 4 : Iron is more reactive than copper. Iron displaces copper from copper sulphate solution and forms iron sulphate, hence the colour of solution changes.

Equation : $Fe + CuSO_4(aq) \longrightarrow FeSO_4(aq) + Cu$ **1+1**

Ans. 5 : (a) $2Mg + O_2 \longrightarrow 2MgO$
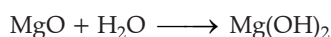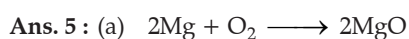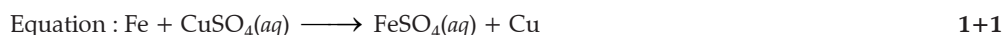
$MgO + H_2O \longrightarrow Mg(OH)_2$
Oxidation reaction
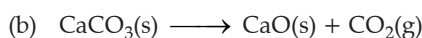
(b) $CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$
(Lime stone)   (quick lime)
Reduction reaction.   **1½+1½**

Ans. 6 : Iron is more reactive than copper. Iron displaces copper from copper sulphate solution and forms iron sulphate, hence the colour of solution changes.

Equation : $Fe\ (s) + CuSO_4(aq) \longrightarrow FeSO_4(aq) + Cu\ (s)$ **1+1**
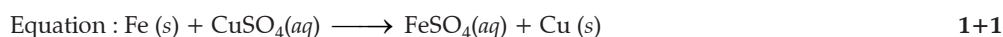
Ans. 7 : (a) Corrosion : The process in which metals breakdown gradually by the air, moisture or a chemical on their surface.

(b) Rusting of Iron

(c) By the development of a black coating on silver.

(d) Every year enormous/large amount of money is spent to replace damaged iron.

(e) Paint, galvanization, electroplating (any one)   **[CBSE Marking Scheme, 2015] 1+1+1+1+1**

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SUMMATIVE ASSESSMENT   WORKSHEET-5

Ans. 1 : $2CO(g) + O_2(g) \longrightarrow 2CO_2(g)$
(Carbon   (Oxygen)   (Carbon dioxide)
monoxide)   **1**

Ans. 2 : $NaCl + AgNO_3 \longrightarrow AgCl + NaNO_3$
(Sodium   (Silver   (Silver   (Sodium
chloride)   nitrate)   chloride)   nitrate)   **1**

Ans. 3 : (i)   To prevent rancidity.
(ii) Rusting and corrosion.   **[CBSE Marking Scheme, 2014] 1+1**

Ans. 4 : $Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Fe$ **1**

Displacement reaction is the reaction in which one element displaces another element.
                                                [CBSE Marking Scheme, 2012] ½+½

Ans. 5 : (i)   Silver : Colour — Black
Chemical name — Silver sulphide
(ii) Copper : Colour — Green
Chemical name — Copper oxide
(iii) Iron : Colour — Reddish Brown
Chemical name — Ferric oxide.   **1+1+1**

Ans. 6 : (i) $CaCO_3(s) \xrightarrow{\text{Heat}} CaO(s) + CO_2(g)$
(Calcium   (Calcium   (Carbon
carbonate)   oxide)   dioxide)

(ii) $2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl(g)$
(Silver chloride)   (Silver)   (Chloride)

(iii) $2H_2O(l) \xrightarrow{\text{Electric current}} 2H_2(g) + O_2(g)$

(Water)   (Hydrogen) (Oxygen)   **1+1+1**

Ans. 7 : (a)   When fats and oils are oxidised, the food becomes rancid *i.e.,* their smell and taste changes.
The type of chemical reaction is oxidation.
Definition : Rancidity is the process of slow oxidation of oil and fat present in the food materials
resulting in the production of foul odour and taste in them.
(b)   Methods to Prevent Rancidity :
(i)   Refrigeration of cooked food at low temperatures.
(ii) Packing of food materials in air tight containers.
(iii) By adding antioxidants e.g., BHA (Butylated hydroxyanisole)   **1+1+3**

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SUMMATIVE ASSESSMENT   WORKSHEET-6

Ans. 1 : In combination reactions, two substances combine to form one compound and in decomposition reactions, a compound breaks down into two or more substances, so they are opposite to each other. **1**

Ans. 2 : Electrolytic reduction.   **1**

Ans. 3 : Light green is the colour of crystalline $FeSO_4.7H_2O$. Light green changes to reddish brown or brown
upon heating.   **1**

(a) $FeSO_4.7H_2O \xrightarrow{\Delta} FeSO_4 + 7H_2O$

(b) $2FeSO_4 \xrightarrow{\text{Heat}} Fe_2O_3 + SO_2 + SO_3$ **[CBSE Marking Scheme, 2012] 1**

Ans. 4 : A reaction in which two or more simpler substances combine to form a single product.   **1**
Example : $C + O_2 \xrightarrow{\text{Burn}} CO_2$ **½**

$2H_2 + O_2 \longrightarrow 2H_2O$ **[CBSE Marking Scheme, 2012] ½**

Ans. 5 : The oxidation of oils or fats in a food resulting into bad smell and bad taste is called rancidity.   **1**

It can be prevented by—
(i)   adding of anti-oxidants   **1**
(ii)   flushing with nitrogen gas.   **[CBSE Marking Scheme, 2012] 1**

Ans. 6 : On mixing the clear solution of two ionic compounds, a substance which is insoluble in water is formed. This insoluble substance is known as a precipitate and the reaction in which precipitate is formed is called as precipitation reaction.

Example : When sodium sulphate solution is mixed with barium chloride solution, a white precipitate of a substance ($BaSO_4$) is formed

$$Na_2SO_4(aq) + BaCl_2(aq) \longrightarrow BaSO_4(\downarrow) + 2NaCl(aq)$$ **[CBSE Marking Scheme, 2013] 1+1+1**

Ans. 7 : (a)   Corrosion.   ½
(b)   Conditions are – air and moisture.   ½+½

Activity :

Take three test-tubes. Place clean iron nails in each test-tube.
- Pour some water in test-tube-1, cork it.
- Pour water (boiled/distilled) in test-tube-2, add some oil and cork it.
- Put some anhydrous calcium chloride in test-tube-3 and cork it.
- After 2-3 days, we observe that the nails in test-tube 1 get rusted because they are exposed to air and water both, while nail in test-tube 2 and 3 do not get rusted. This shows rusting of iron takes place in the presence of air and moisture both.   **2½**

Methods to prevent rusting : Alloying, galvanization, painting, lubrication (any 2).   ½+½

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PRACTICAL BASED QUESTIONS   WORKSHEET-7

Ans. 1 : (B)   Solution becomes pale green to colourless.   **(1)**
Ans. 2 : (B)   Zinc is less reactive than Iron.   **(1)**
Ans. 3 : (B)   Because Iron is more reactive than zinc and replaces zinc in $ZnSO_4$.   **(1)**
Ans. 4 : (B)   Reddish brown residue is due to formation of Fe_2O_3.   **(1)**
Ans. 5 : (B)   Solid product formed on heating $FeSO_4$ is brown and smell of sulphur dioxide and sulphur trioxide is left.   (1)
Ans. 6 : When a solution of sodium sulphate is mixed with a solution of barium chloride, the following double displacement reaction takes place :

$$Na_2SO_4(aq) + BaCl_2(aq) \longrightarrow BaSO_4(s) + 2NaCl(aq)$$
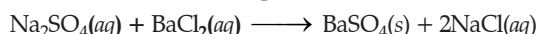
In this reaction, sulphate ions from sodium sulphate are displaced by chloride ions (Cl^-) and chloride ions in barium chloride are displaced by sulphate ions. As a result, a white precipitate of barium sulphate is formed and sodium chloride remains in the solution.   **1+1**
Ans. 7 : The aqueous solutions of barium chloride and sodium sulphate can be prepared by dissolving 6.1 g $BaCl_2.2H_2O$ and 3.2 g of $Na_2SO_4.10H_2O$ in water and then diluting them to 100 ml separately.

1+1
Ans. 8 : The iron nails must be cleaned properly by using sand paper before dipping them in copper sulphate solution.   **1+1**
Ans. 9 : Iron displaces copper ions from an aqueous solution of copper sulphate. It is a single displacement reaction of one metal by another metal. Iron is placed above copper in the activity series. Elements placed above in this series are more reactive than those placed below them. Thus iron is more reactive than copper. In this reaction, metallic iron is converted into ferrous ion (Fe^{2+}) and cupric ion (Cu^{2+}) is converted into metallic copper.

$$Fe(s) + Cu_{2+}(aq) \longrightarrow Fe_{2+}(aq) + Cu(s)$$ **1+1**
Ans. 10 : It is a combination reaction as a new product calcium hydroxide will be produced while combining both the reactants.   **1+1**

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FORMATIVE ASSESSMENT   WORKSHEET-8

Note : . Students should do this activity themselves.

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2 ACIDS, BASES AND SALTS

TOPIC-1
Acid, Bases and Salts

SUMMATIVE ASSESSMENT   WORKSHEET-9

Ans. 1 : Hydrogen gas.   **1**

Ans. 2 : pH = 2 (lower the pH, stronger the acid).   **1**

Ans. 3 : Tooth enamel is made up of compound calcium phosphate. Its pH is 5.5. Bacteria present in mouth work on the left food particles and produce acid. Tooth pastes are used for neutrilising the excess acid.   **½+½+½+½**

Ans. 4 : Sodium hydroxide (NaOH) is a commonly used base and is hygroscopic, *i.e.,* it absorbs moisture from the atmosphere and becomes sticky.   **1**

The acidic oxides react with base to give salt and water.

$$2NaOH(aq) + CO_2(g) \longrightarrow Na_2CO_3(aq) + H_2O(l)$$ **1**

Ans. 5 : Put blue litmus paper in all the three test tubes. In one test tube it will turn red that is acid.

Now Put red Litmus paper in both the test tubes in one it will turn to blue that is base and the third one is distilled water.   **(CBSE Marking Scheme 2015) 3**

Ans. 6 : (i)   Tomato — Malic acid and citric acid
　　　　 (ii)   Vinegar — Acetic acid
　　　　 (iii) Tamarind — Tartaric acid and citric acid.

Ans. 7 : (a)

Indicators	Acid	Base
Litmus solution	Blue to Red	Red to Blue
Phenophthalein	Colourless	Pink
Methyl orange	Orange	Yellow

　　　　 (b)   Solution A — Basic solution
　　　　　　　Solution B — Acidic solution
　　　　　　　Because [H^+] is greater than 1.0×10^{-7} m   **5**

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SUMMATIVE ASSESSMENT   WORKSHEET-10

Ans. 1 : Formic acid (Methanoic acid) HCOOH.   **1**

Ans. 2 : When milk changes into curd, its pH will decrease. Because curd contain acid so H^+ increases and thus pH will decrease.   **1**

Ans. 3 : Hydrogen gas.

When zinc reacts with dilute hydrochloric acid,

$$2HCl + Zn \longrightarrow ZnCl_2 + H_2$$
Colourless gas with pop up sound is evolved.   **½+1+½**

Ans. 4 : $2FeSO_4 \xrightarrow{\text{Heat}} Fe_2O_3 + SO_2 + SO_3$

Crystals loose their colour, due to loss of water of crystallization on heating, hence the colour is changed.   **[CBSE Marking Scheme, 2013] 1+1**

Ans. 5 : Acids which ionize completely in aqueous solution—strong acids. ½

Acids which ionize partially in aqueous solution—weak acids ½

Hydrochloric acid, nitric acid—strong acid ½+½

Acetic acid, formic acid—weak acid ½+½

Ans. 6 : (a) Blue and white respectively. **1**

(b) Water of crystallization is lost on heating. **1**

(c) Yes, by adding water. **1**

Ans. 7 : (i) (a) Solution is an acid. Substance in egg shell is calcium carbonate.

(b) Effervescence is due to the evolution of CO_2 gas.

(c) $2HNO_3 + CaCO_3 \longrightarrow 2Ca(NO_3)_2 + H_2O + CO_2$

(d) Lime stone. **1+1+1+½**

(ii)

6 Volt battery → Bulb

Switch

Beaker

Nail
Dilute HCl
solution

Rubber
Cock **1½**
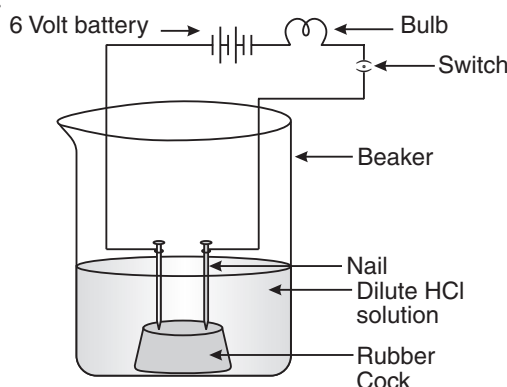
Fig. Acid solution in water conducts electricity

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SUMMATIVE ASSESSMENT   WORKSHEET-11

Ans. 1 : At lower pH below 5.5, the calcium phosphate present on the enamel tooth is corroded. **(1)**

Ans. 2 : 1 M HCl has a higher concentration of H^+ ions, because when HCl dissolves in water and it dissociates completely into ions while CH_3COOH is a weak acid and does not dissociates into ions completely. **(1)**

Ans. 3 : pH decreases.

It is due to the formation of lactic acid in curd, so H^+ concentration increases. **1+1**

Ans. 4 : pH of a solution is a measure of the H^+ concentration in a solution. Lesser the pH, more acidic is the solution. Thus, rain water of city *B* is more acidic. **(2)**

Ans. 5 : (a) (i) Solution of glucose will not conduct electricity because it does not have ions.

(ii) Dil. HCl will conduct electricity because it produces H^+ ions in water. **½+½**

(b) HCl is stronger because it gives rise to more H^+ ions than acetic acid. **1**

(c) The strength of the acid decreases. **1**

Ans. 6 : The colour changes from yellow to reddish brown. **(1)**

Soap is basic in nature and the colour of turmeric changes from yellow to reddish brown in basic medium. The stain turns yellow again. **(2)**

Ans. 7 : (i) Hydrogen, burns with pop sound. **½+½**

(ii) (a) $Zn(s) + 2HCl \longrightarrow ZnCl_2(aq) + H_2(g)$ **½+½**
Zinc chloride

(b) $Zn(s) + NaOH \longrightarrow Na_2ZnO_2 + H_2$ **½+½**
Sodium zincate

(iii) HCl, $NH_4OH \Rightarrow NH_4OH + HCl \longrightarrow NH_4Cl + H_2O$ ½+½

Nature of salt-acidic as it is formed by neutralisation of strong acid and weak base.

Its pH value will be less than 7 (pH range 1-6)   **[CBSE Marking Scheme, 2012]** ½+½

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TOPIC-2
Salts, Their Properties and Uses

SUMMATIVE ASSESSMENT   WORKSHEET-12

Ans. 1 : Plaster of paris, $CaSO_4 . \dfrac{1}{2} H_2O$.   **1**

Ans. 2 : Washing soda ($Na_2CO_3 . 10H_2O$).   **1**

Ans. 3 : Sodium carbonate when dissolves in water forms an alkaline solution which turns red litmus blue. It shows that its aqueous solution is basic in nature.   **2**

Ans. 4 : The chemical formula of baking soda is $NaHCO_3$.   ½

It is prepared by using sodium chloride.

$NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$.   **1**

On heating :

$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + H_2O + CO_2$ ½

Ans. 5 : Water of crystallisation is a fixed no. of water molecules present in one formula unit of a salt. One formula unit of copper sulphate contains five water molecules ($5H_2O$). The water molecules which form part of the structure of a crystal are called water of crystallisation.

$CuSO4.5H2O \xrightarrow{\text{Heat}} CuSO4 + 5H2O$
(Hydrated copper   (An hydrous   water
   sulphate)   copper sulphate) (Goes away)
   (Blue)   (White)

* Due to loss of water of crystallisation.

$CuSO4 + 5H2O \longrightarrow CuSO4.5H2O$
Anhydrous   water   Hydrated copper
copper sulphate   sulphate
   (white)   (blue)

* by adding water   **1+1+1**

Ans. 6 : (a) X = Chlorine gas, Y = Calcium oxychloride

(b) $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O_2$
(dry slaked (Chlorine)   (Calcium   (Hydrogen
  lime)   oxychloride)   gas)
    (Bleaching agent)   **1+1+1**

Ans. 7 : Sodium chloride NaCl.

Common salt from sea water and Rock salt.

Uses of common salt :

(i)   As a raw material for making a large number of useful chemicals in industry as sodium hydroxide, sodium bicarbonate, sodium carbonate, hydrochloric acid.

(ii) Used in cooking food. It is essential in our food for the proper functioning of nervous system, the movement of muscles, and the production of HCl in our stomach for the digestion of food.

(iii) Used as a preservative in pickles

(iv) Used in the manufacture of soap. **(any three)**

Mahatma Gandhi's Dandi March was for the procurement of common salt for common man. It is the most essential product of daily use. **[CBSE Marking Scheme, 2014] 5**

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SUMMATIVE ASSESSMENT   WORKSHEET-13

Ans. 1 : Baking soda. **1**

Ans. 2 : The colour of litmus in a solution of sodium carbonate is blue. **1**

Ans. 3 : Carbon dioxide (CO_2). **1**

Pass this gas to lime water, it turns lime water milky. **1**

Ans. 4 : Calcium oxide

$$CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq)$$ **2**

Ans. 5 : The reaction between an acid and a base to give a salt and water is known as a neutralisation reaction.

$$Base + Acid \longrightarrow Salt + Water$$

$$NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H2O(l)$$ **1+1+1**
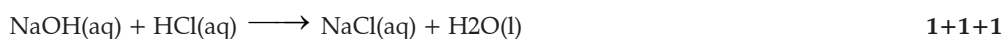
Ans. 6 : (a) It losses water molecules and become calcium sulphate hemihydrate $CaSO_4 . \frac{1}{2} H_2O$ or plaster of paris.

(b) Blue copper sulphate crystals on heating lose water of crystallisation and become white. When these crystals are left open, they absorb moisture from air and regain blue colour.

(c) On passing CO_2 gas through lime water, insoluble calcium carbonate is formed. On passing excess of CO_2, soluble calcium bicarbonate is formed.

$$Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O(l)$$
                                    Insoluble
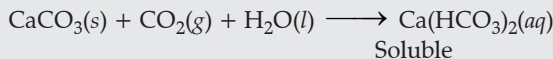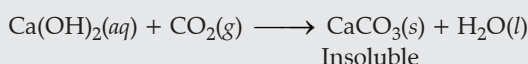
$$CaCO_3(s) + CO_2(g) + H_2O(l) \longrightarrow Ca(HCO_3)_2(aq)$$
                                    Soluble   **[CBSE Marking Scheme, 2014] 1+1+1**

Ans. 7 : (a) Hydrochloric acid and sodium hydroxide. $NaOH + HCl \longrightarrow NaCl + H_2O$ **½+½**

NaCl, sodium chloride, Ocean water. **½+½**

(b) Deposits of solid salt are found in several parts of the world. These large crystals are called rock salt. **2**

Colour of rock salts is brown, due to impurities.

(c) $2NaCl + 2H_2O \xrightarrow{\text{electricity}} 2NaOH + Cl_2 + H_2$ **[CBSE Marking Scheme, 2012] 1**

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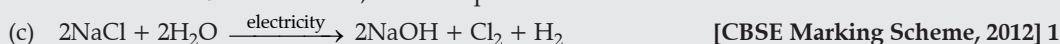
SUMMATIVE ASSESSMENT   WORKSHEET-14

Ans. 1 : Bleaching powder. **1**

Ans. 2 : Sodium carbonate. **1**

Ans. 3 : To salt, add few drops of dilute HCl or H_2SO_4, if colourless gas is evolved with brisk effervescence and on passing it through lime water, the lime water turns milky, the gas is CO_2 and salt is a carbonate of metal. **2**

Ans. 4 : $CuSO_4 + Fe \longrightarrow FeSO_4 + Cu$ **1**
         (Blue)   (Green)

Iron is more reactive than copper. Hence it displaces copper from copper sulphate and due to formation of $FeSO_4$, the colour changes from blue to green. **1**

Ans. 5 : Chemical formula — $CaOCl_2$ ½
Chemical equation —
$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$ 1
Uses :
(i)   For bleaching cotton and linen in textile industry½
(ii) As an oxidising agent in a chemical industry.   ½
(iii) For disinfecting water.   **[CBSE Marking Scheme, 2012]** ½

Ans. 6 : $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$ 1
Marble is calcium carbonate and on reacting with HCl releases CO_2
$Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$
(Lime water)   (White ppt)
Lime water turns milky due to the formation of white ppt of $CaCO_3$ on passing excess CO_2, milkiness
disappears because $Ca(HCO_3)_2$ is formed which is soluble in water.   1
$CaCO_3 + H_2O + CO_2 \longrightarrow Ca(HCO_3)_2$ 1
Soluble in water   **[CBSE Marking Scheme, 2012]**

Ans. 7 : (a) Chemical name — Sodium carbonate decahydrate
Formula — $Na_2CO_3.10H_2O$ ½+½

(b) $NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3.$
$2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + CO_2\uparrow + H_2O$

$Na_2CO_3 + 10H_2O \longrightarrow Na_2CO_3.10H_2O$ 2
(c) It is a basic salt because when dissolved in water, it gives a strong base NaOH.
It is used as a clearing agent, in paper and glass industry.   **[CBSE Marking Scheme, 2012]** 2

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PRACTICAL BASED QUESTIONS   WORKSHEET-15

Ans. 1 : (A) Lemon juice gives light orange colour.   **(1)**
Ans. 2 : (B) H^+ ion gives concentration.   **(1)**
Ans. 3 : (A) Hydrogen gas emerged with pop sound.   **(1)**
Ans. 4 : (C) HCl have acid pH = 3   **(1)**
Ans. 5 : (A) red, green, blue   **(1)**
Ans. 6 : (B) hydrogen   **(1)**
Ans. 7 : Colour - Green , pH- neutral; 7   **(1+1)**
Ans. 8 : It will turn red litmus blue as it is basic in nature.   **(1+1)**
Ans. 9 : Base is bitter in taste and produces hydrogen gas when reacted with metals.   **(1+1)**
Ans. 10 : It indicates that the given solution is acidic in nature. The pH of 1M HCl solution is zero.   **(1+1)**
Ans. 11 : CO_2 is acidic oxide. As CO_2 comes out of the solution, acidic character of solution decreases and as
such pH increases.   **(2)**

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FORMATIVE ASSESSMENT   WORKSHEET-16

Note : . Students should do this activity themselves.

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3 METALS AND NON-METALS

TOPIC-1
Properties of Metals and Non-Metals

SUMMATIVE ASSESSMENT　　　　　　　　WORKSHEET-17

Ans. 1 : They get tarnished by reacting with atmospheric air to form silver sulphide.　**1**

Ans. 2 : Hydrogen gas.　**1**

Ans. 3 : When it is heated in air, it is first converted into mercuric oxide (HgO). Mercuric oxide is then reduced to mercury on further heating.

$$2HgS(s) + 3O_2(g) \xrightarrow{Heat} 2HgO(s) + 2SO_2(g)$$

$$2HgO(s) \xrightarrow{Heat} 2Hg(l) + O_2(g) \qquad \mathbf{1+1}$$

Ans. 4 : Two solid metals are :
　(i)　Copper (Cu)　　　　　　　　(ii)　Sodium (Na).
　Two solid non-metals are :
　(i)　Iodine (I)　　　　　　　　　(ii)　Silicon (Si)　**½+½+½+½**

Ans. 5 : (a)　Sodium (Na) > Aluminium (Al) > Copper (Cu) >Gold (Au).

　(b)　$3MnO_2(s) + 4Al(s) \xrightarrow{\Delta} 3Mn(l) + 2Al_2O_3(s) + Heat$　**2 + 1**

Ans. 6 : The metal has corroded because of being exposed to moist air.　½
　Green compound is basic copper carbonate $[CuCO_3.Cu(OH)_2]$　**1**
　The metal is copper.　½
　Two ways to prevent this process :
　Painting, Greasing, Oiling, Galvanizing (any two)　**½+½**

Ans. 7 : Take some metals like Ca, Mg and Fe etc. Place separately small pieces of these metals in beakers with small amount of water in them. If the metals react with the cold water, then the reaction is vigorous. If metal does not react with cold water, then treat it with hot water. Record the observations and arrange the metals in decreasing order of reactivity.

Metal	Reaction	Observation	Chemical reaction
Fe	Steam	Fe_3O_4 and $H_2(g)$	$3Fe(s) + 4H_2O(g) \longrightarrow Fe_3SO_4(s) + H_2(g)$
Mg	Hot water	$Mg(OH)_2(aq)$ & $H_2(g)$	$Mg(s) + 2H_2O(hot) \longrightarrow Mg(OH)_2(aq) + H_2(g)$
Ca	Cold water	$Ca(OH)_2(aq)$ & $H_2(g)$	$Ca(s) + 2H_2O(l) \longrightarrow Ca(OH)_2(aq) + H_2(g)$
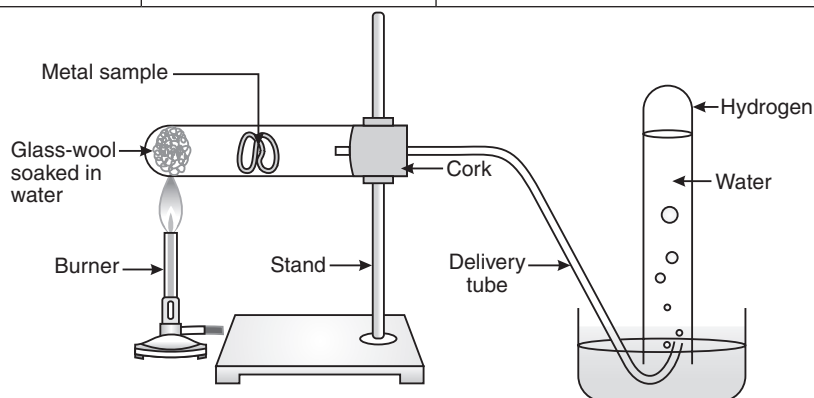
1+3+1

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SUMMATIVE ASSESSMENT   WORKSHEET-18

Ans. 1 : Silver or Copper.   **1**

Ans. 2 : Malleability, ductility, lustrous (any two).   **½+½**

Ans. 3 : Blue colour changes to light green. Reddish brown deposit on the iron nail.   **1**

$Fe(s) + CuSO_4(aq) \longrightarrow FeSO_4(aq) + Cu(s)$ **1**

Ans. 4 : The two metals are :
  (i) Calcium (Ca)
  (ii) Magnesium (Mg)   **1+1**
  They starts floating because the bubbles of hydrogen gas which are formed during the reaction stick to the surface of the metal.   **1**

Ans. 5 : Three properties of sodium are :
  (i) Sodium is so soft that it can be cut with a knife.   **1**
  (ii) It has low density.   **1**
  (iii) It has low melting point.   **1**

Ans. 6 : (i) A = Carbon (C), B = Carbon monoxide (CO), C = Carbon dioxide (CO_2).
  (ii) Carbon (or A) has atomic number = 6
  It electronic configuration is 2, 4. It is present in 14th group (10 + valence electron) of the periodic table.   **1½+1½**

Ans. 7 : Metals high up in reactivity series are extracted by electrolytic reduction.   **1**
  While those in the middle are extracted first by converting into oxide and then reducing by carbon.   **1**

  Same method cannot be used because metals have more affinity for oxygen than carbon.   **1**
  Molten sodium chloride is taken for electrolytic reduction. The metal is deposited at the cathode and chlorine is liberated at anode.   **1**

  At cathode : $Na^+ + e^- \longrightarrow Na$ **½**

  At anode : $2Cl^- \longrightarrow Cl_2 + 2e^-$ **½**

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SUMMATIVE ASSESSMENT   WORKSHEET-19

Ans. 1 : Metal – mercury, Non-metal – bromine.   **½+½**

Ans. 2 : Metallic oxides are basic, few are amphoteric
  Non-metallic oxides are acidic, few are neutral.   **½+½**

Ans. 3 : Calcium starts floating because the bubbles of hydrogen gas formed and stick to the surface of the metal.   **1**

$Ca + 2H_2O \longrightarrow Ca(OH)_2 + H_2$ **1**

Ans. 4 : Activity : Metal Q is added to salt solution of P, Q being more reactive, displaces metal P from its salt solution.   **1**

  Chemical equation : Metal Q + Salt solution of P $\longrightarrow$ Salt solution of Q + Metal P.   **1**

Ans. 5 : (i) Non-metals are electron acceptors, they cannot supply electrons so as to convert H^+ ion to $H_2(g)$.
  (ii) Like metals, hydrogen can lose an electron to form positive H^+ ion.
  (iii) Aluminium is covered with a strong protective layer of oxide which protects the metal from further corrosion.   **1+1+1**

Ans. 6 : (a) Because it has a great affinity for oxygen and there is a shining coating of aluminium oxide on the foil which is stable.
  (b) Calcium floats over water because the bubbles of hydrogen gas formed and stick on the surface of the metal.   **1½+1½**

Ans. 7 : (i) The nature of the solution is acidic. It is a mixture of conc. HNO_3 and conc. HCl in the ratio of 1 : 3. It can dissolve gold as it is an oxidising agent.   **3**
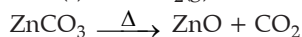 (ii) Pure gold is 24 carat gold which is very soft.   **2**

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Metallurgy and Bonds

SUMMATIVE ASSESSMENT   WORSHEET-20
SUMMATIVE ASSESSMENT   WORKSHEET-20

Ans. 1 : Because aluminium has greater affinity for oxygen than for cabon, therefore carbon cannot reduce alumina (Al_2O_3) to aluminum.   **1**

Ans. 2 : ZnO(s) and CO_2(g) are formed.

$$ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$$ **1**

Ans. 3 : (i)   Zinc
(ii) Aluminium
(iii) Maganese
(iv) Mercury   **[CBSE Marking Scheme, 2014]** ½+½+½+½

Ans. 4 : The compounds which have bonds formed by loss and gain of electrons are called ionic compounds or electrovalent compound and the bond formed is know as ionic bond or electrovalent bond.

Two properties of Ionic compounds :
(i) Ionic compounds are hard and brittle.
(ii) Ionic compounds have high melting and boiling points.   **1+½+½**

Ans. 5 : (a) Na, K, Li etc. are very reactive so these metals reacts vigorously with atmospheric oxygen to form oxides. Storing them in oil prevents their oxidation.

(b) Platinum, gold and silver are least reactive *i.e.*, noble metals, so they are not corroded by air and water easily.

(c) Copper vessels get tarnished by reacting with air and water, due to which a layer is formed. It mainly contains black copper oxide and green copper hydroxide which is basic in nature. The citric acid in lemon dissolve this layer and washes off easily.   **1+1+1**

Ans. 6 : Electrolytic Refining **:** This method is widely used as purification of metals like zinc (Zn), copper (Cu), aluminium (Al), chromium (Cr), tin (Sn), lead (Pb), nickel (Ni), gold (Au). In this process, impure metal is used as anode, a strip of pure metal is used as cathode and soluble salt of metal is used as electrolyte. On passing electric current through the electrolyte. cations move towards cathode, gain electrons and pure metal gets deposited on cathode.
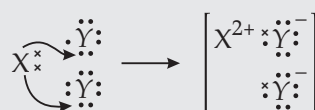
In electrolytic refining of copper, the impurities left behind at anode are called anode mud they contains valuable metals such as gold and silver which can be recovered in the native state.
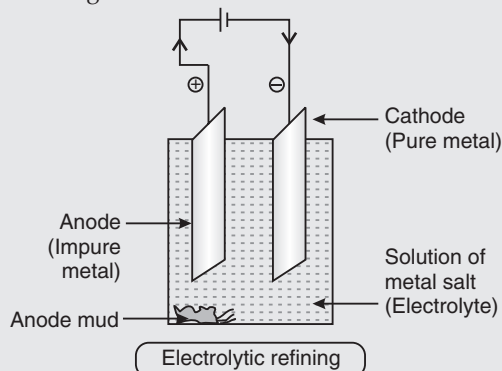
(Electrolytic refining of copper with explanation)

[CBSE Marking Scheme, 2014] 3

Ans. 7 : X–2, 8, 2, Y–2, 7

Nature of bond in XY_2 is ionic.

Properties :

(i) Crystalline solids.

(ii) Melting and boiling point high.

(iii) Soluble in water, insoluble in organic solvents.

(iv) Conductor of electricity. **[CBSE Marking Scheme, 2014] (any three) 1+4**

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SUMMATIVE ASSESSMENT <div style="float:right">**WORKSHEET-21**</div>

Ans. 1 : Ionic Bond. **1**

Ans. 2 : The extraction of metals from their ores and then refining them for use is known as metallurgy. **1**

Ans. 3 : In ionic compounds, cations and anions are held together by strong electrostatic forces of attraction. Hence large amount of energy is required to overcome these forces.
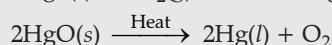
[CBSE Marking Scheme, 2012] 2

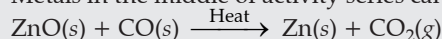**Ans. 4 :** (i) $2Cu_2S + 3O_2 \xrightarrow{\text{Heat}} 2Cu_2O(s) + 2SO_2(g)$ **1**

(ii) $2Cu_2O + Cu_2S \xrightarrow{\text{Heat}} 6Cu(s) + SO_2(g)$ **[CBSE Marking Scheme, 2012] 1**

Ans. 5 : (a) Metal X is obtained simply by heating their oxides with carbon. *e.g.*, mercury obtained from cinnabar.
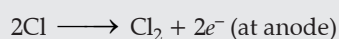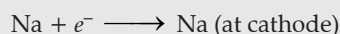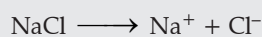
$2HgS(s) + 3O_2(g) \xrightarrow{\text{Heat}} 2HgO(s) + 2SO_2(g)$

$2HgO(s) \xrightarrow{\text{Heat}} 2Hg(l) + O_2$

(b) Metals in the middle of activity series can be obtained by heating with carbon, *e.g.*,

$ZnO(s) + CO(s) \xrightarrow{\text{Heat}} Zn(s) + CO_2(g)$ **1**

(c) Metals high in the reactivity series are obtained by electrolytic reduction of molten ores *e.g.*, in NaCl

$NaCl \longrightarrow Na^+ + Cl^-$

$Na + e^- \longrightarrow Na$ (at cathode)

$2Cl \longrightarrow Cl_2 + 2e^-$ (at anode) **[CBSE Marking Scheme, 2014] 1**

Ans. 6 : (a) Metallic compounds like sodium cannot be reduced by carbon or any other reducing agent due to their high affinity with oxygen.

(b) Sodium is obtained from sodium chloride by electrolytic reduction. Sodium chloride in molten form is electrolysed.

Sodium is deposited at cathode and chlorine is liberated at anode. **1**

At cathode : $Na^+ + e^- \longrightarrow Na$
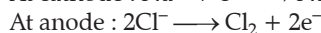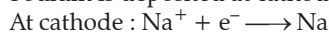
At anode : $2Cl^- \longrightarrow Cl_2 + 2e^-$ **1 + 2**

Ans. 7 : The two reactive metals are : sodium (Na) and potassium (K). Sodium reacts with chlorine. **1 + 1**

$$Na \longrightarrow Na^+ + e^-$$
2, 8, 1   2, 8

(Sodium cation)

$$Cl + e^- \longrightarrow Cl^-$$
2, 8, 7   2, 8, 8

(Chlorine anion)

$\dot{N}a + {}^{\times\times}_{\times\times}\!\overset{\times\times}{Cl}\!{}^{\times\times} \longrightarrow [Na^+]\left[{}^{\times\times}_{\times\times}\!\overset{\times\times}{Cl}\!{}^{\times\times}\right]^-$
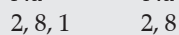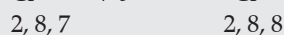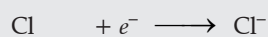
1

Ionic compounds have high melting and boiling points. **4×½ = 2**

They are good conductors of electricity.

They are generally soluble in water and insoluble in organic solvents.

They are solid, hard, brittle. **[CBSE Marking Scheme, 2012]**

SUMMATIVE ASSESSMENT   WORKSHEET-22

Ans. 1 : Paint forms a protective coating on the surface of iron. Then oxygen and moisture present in the air cannot have a direct contact with the metal. Therefore, surface gets protected against rusting. **1**

Ans. 2 : Reduction of iron oxide to iron by aluminum is called thermite reaction. **1**

$$Fe_2O_3 + 2Al \longrightarrow 2Fe + Al_2O_3 + Heat.$$
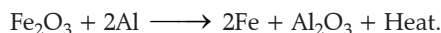
Ans. 3 : Oxides which show both acidic and basic behaviour and oxides that react with both acids as well as bases to produce salts and water.

Example : Al_2O_3 and ZnO. **[CBSE Marking Scheme, 2012] 2**

Ans. 4 : The compounds formed by the transfer of electrons from a metal to a non-metal are called ionic compounds. **1**

Ionic compounds in the solid state do not conduct electricity because movement of ions in the solid is not possible due to their rigid structure, but in the molten state ions move freely. **1**

[CBSE Marking Scheme, 2012]

Ans. 5 : Calcination : Heating ore strongly in limited amount of oxygen.

$$ZnCO_3 \xrightarrow{\text{Heat}} ZnO + CO_2$$

Calcination

Reduction : Converting ZnO to Zn with the help of carbon.

$$ZnO + C \longrightarrow Zn + Co$$ **[CBSE Marking Scheme, 2013] 1+½+1+½**

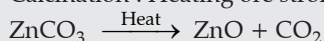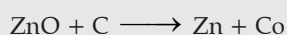**Ans. 6 :** (i) Slow eating of metals due to attack of atmospheric gases so as to convert the metal into its oxide, sulphide or carbonate etc. is called corrosion.

(ii) A protective layer is formed on its surface to prevent it from further corrosion (Al_2O_3)

(iii) Formation of copper oxide on it from direct contact with air and moisture *i.e.,* due to corrosion in copper. **[CBSE Marking Scheme, 2013] 3**

Ans. 7 : (i) No, these are pure.

(ii) Due to the reaction of silver with almospheric H_2S, which results in the formation of black coloured silver sulphide.

(iii) Ag_2S dissolves in acids present in tamarind or lemon juice, so the anklets got their lustre back.

(iv) The values exhibited by Rakhi are awareness, helpful and knowledgeable. **1+1½+1½+1**

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PRACTICAL BASED QUESTIONS   WORKSHEET-23

Ans. 1 : (A) No reaction takes place. **1**

Ans. 2 : (C) The ferrous sulphate was not an aqueous solution. **1**

Ans. 3 : (B) Gas is evolved vigorously in beaker I but not so in beaker II because Zn reacts with HCl very fast but reacts slowly with NaOH at room temperature. **1**

Ans. 4 : (B) Blue solution becomes colourless, reddish brown Cu gets deposited.

$$Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$$ **1**

Ans. 5 : (A) Surface of zinc becomes black and dull as $ZnCl_2$ is formed.
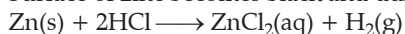
$$Zn(s) + 2HCl \longrightarrow ZnCl_2(aq) + H_2(g)$$ **1**

Ans. 6 : Most reactive : C

Least reactive : B **1 + 1**

Ans. 7 : In test-tube B change will be observed because iron is more reactive than copper and it will displace Cu from $CuSO_4$. $CuSO_4 + Fe \longrightarrow FeSO_4 + Cu$. **1 + 1**

Ans. 8 : Reaction does not occurs in I, II, IV

Reason : It occurs in (III) because Al is more reactive than Cu, so it will displace Cu from $CuSO_4$. **1+1**

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FORMATIVE ASSESSMENT   WORKSHEET-24

Note : . Students should do this activity themselves.

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4 LIFE PROCESSES

TOPIC-1

Nutrition

SUMMATIVE ASSESSMENT   WORKSHEET-25

Ans. 1 : Small intestine in Alimentary canal.   1

Ans. 2 : Gastric glands are present in the wall of stomach which releases hydrochloric acid, mucus and protein digesting enzyme pepsin.   **[CBSE Marking Scheme, 2014] 1**

Ans. 3 : Saliva moistens the ingested food with mucus, sterlises it with lysozyme and partially digests starch part of food into sugar with the help of salivary amylase or ptyaline.   1

Ans. 4 : Site of Complete digestion : Small intestine in alimentary canal.
End products formed are :
Proteins $\longrightarrow$ Amino acids
Carbohydrates $\longrightarrow$ Simple sugars
Fats $\longrightarrow$ Fatty acids + Glycerol.   ½+½+½+½

Ans. 5 : Herbivores have longer small intestine to allow the cellulose to be digested completely. Herbivores have longer intestine than carnivores to digest grass. The intestine would host many small bacteria that process and breakdown cellulose into glucose.   2

Ans. 6 : The organisms make their own food from simple inorganic substances and need sunlight.
By products $\longrightarrow$ CO_2, H_2O, sunlight,
Source $\longrightarrow$ Sun, earth environment   1+1+1

Ans. 7 : It is the mode of nutrition in which an organism cannot make its own food and depends on other organisms for food. All the animals including man, most bacteria and some fungi have heterotrophic mode of nutrition and these organisms are called heterotrophs.
Holozoic, Saprophytic and Parasitic.   **[CBSE Marking Scheme, 2014] 3**

Ans. 8 : Digestion of fats take place in the small intestine.
The fats are digested by the digestive enzymes. The fats are present in the form of large globules in the small intestine. Bile juice secreted by the liver is poured in the intestine along with pancreatic juice. The bile salts present in the bile juice emulsify the large globules of fats. So, by emulsification large globules breakdown into fine globules to provide larger surface area to act upon by the enzymes.
Lipase enzyme present in the pancreatic juice causes the breakdown of emulsified fats. Glands present in the wall of small intestine secretes intestinal juice which contains lipase enzyme that converts fats into fatty acids and glycerol.

$$\text{Fats} \xrightarrow[\text{bile salts}]{\text{emulsified by}} \text{Emulsified fats} \xrightarrow[\text{Lipase}]{\text{Pancreatic juice}} \text{Break-down of fats} \xrightarrow[\text{Lipase}]{\text{Intestinal juice}}$$

Fatty acids + Glycerol.   5

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SUMMATIVE ASSESSMENT   WORKSHEET-26

Ans. 1 : Digestion of fats occur in duodenum and jejunum parts of small intestine with the help of enzyme lipase that acts on emulsified fat to form fatty acid and glycerol.   1

Ans. 2 : HCl of gastric juice disinfects the food and acidifies it for proper functioning of proteolytic enzyme pepsin.   1

Ans. 3 : Digestive enzyme are hydrolytic proteinaceous substances which cause breakdown of complex and insoluble components of food into simple, soluble and absorbable substances.   1

Ans. 4 : Two events that occur during photosynthesis are :

    (i)   Absorption of light energy by chlorophyll.

    (ii)   Conversion of light energy into chemical energy and splitting of water molecules into hydrogen and oxygen.   **1 + 1**

Ans. 5 : Carbohydrates : Glucose   ½

    Proteins   : Amino acid   ½

    Fats   : Glycerol + Fatty acid   ½ + ½

Ans. 6 : Villi.

    (a)   Villi are richly supplied with blood vessels which take the absorbed food to each and every cell of the body.

    (b)   It also absorbs water.

    (c)   They increase the surface area for the absorption of food.

    [CBSE Marking Scheme, 2013] 1 + 1 + 1

Ans. 7 : Small intestine   ½

Secretions of liver and pancreas mixes with food. Pancreatic enzymes make it alkaline. Bile juice from liver too helps in it. Bile salts break the fat present in the form of large globules into smaller ones, increasing the efficiency of enzyme action. Enzymes like trypsin digests proteins and lipase and breaksdown fats. Intestinal juice convert proteins to amino acids, complex carbohydrate to glucose and fats into fatty acids and glycerol.   **[CBSE Marking Scheme, 2012] 2½**

Ans. 8 : The major part of the process of digestion of food takes place in the small intestine. The digested food is taken up by the walls of the intestine. The inner lining of the small intestine contains numerous finger like projections called villi. The villi increases the surface area for absorption. Each villus is covered by a single layer of epithelium and contains blood vessels and lymph vessel. The food diffuses through the epithelium into the blood vessels.

Glucose, amino acids, minerals and vitamins are absorbed in the blood vessels of the villi; the fatty acids and glycerol are absorbed by lacteals, which are carried to lymph vessels to the point where the lymph vessels empty into the blood stream.   **5**

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TOPIC-2
Respiration

SUMMATIVE ASSESSMENT   WORKSHEET-27

Ans. 1 : The respiratory pigment in human beings is haemoglobin. Haemoglobin is present in RBC's of blood in humans.   ½ + ½

Ans. 2 : Aerobic respiration occur in mitochondria of the cell.   **1**

Ans. 3 : Desert plants take up CO_2 at night and prepare an intermediate molecule. The intermediate molecule is acted upon it and absorbed by the chlorophyll during day.   **1 + 1**

Ans. 4 : During respiration, the carbohydrates are broken down to form glucose. This glucose combine with oxygen in our cells and provide energy (heat).   **1**

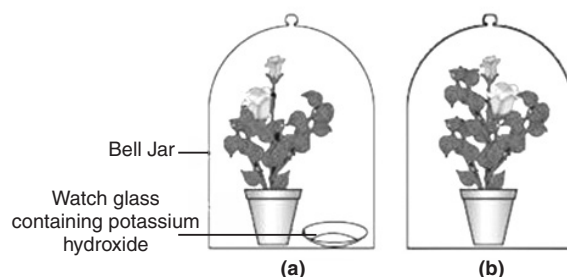 $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + Energy.$ **1**

Ans. 5 : 1.   Take two healthy potted plants which are nearly the same size.

    2.   Keep them in a dark room for three days.

    3.   Now place each plant on separate glass plates, place a watch glass containing potassium hydroxide by the side of one of the plants. The potassium hydroxide is used to absorb carbon dioxide.

Experimental set up (a) with potassium hydroxide (b) Without potassium hydroxide. **3**

Ans. 6 : (i) (a) Smoking cigarettes can cause heart attack, chronic bronchitis.

(b) It can also lead to lung or mouth cancers. ½+½ = 1

(ii) Suggestions :

(a) To organise camps in rural and urban areas to make people understand the ill effects of this addiction.

(b) To make surveys.

(c) By group discussions. **(Any two) 1 + 1 = 2**

Ans. 7 :

S. No.	Aerobic Respiration	Anaerobic Respiration
(i)	Aerobic respiration takes place in the presence of oxygen.	Anaerobic respiration takes place in the absence of oxygen.
(ii)	Complete breakdown of food occurs in this process.	Partial or incomplete breakdown of food occurs in the process.
(iii)	The end products are carbon dioxide (CO_2) and water (H_2O).	The end products may be ethyl alcohol, CO_2 or lactic acid.
(iv)	It produces a considerable amount of energy due to complete oxidation of food.	Much less energy is produced due to incomplete oxidation of food.

Organisms that use the anaerobic mode of respiration are yeast, some bacteria and some parasite.

4 + 1

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SUMMATIVE ASSESSMENT   WORKSHEET-28

Ans. 1 : Plants perform photosynthesis for utilising CO_2. **1**

Ans. 2 : Diffusion is the principle of exchange of gases. **1**

Ans. 3 : This plant will not remain healthy for a long time because :

(a) It will not get oxygen for respiration.

(b) It will not get carbon dioxide for photosynthesis.

(c) Upward movement of water and minerals would be hampered due to lack of transpiration.

(any two) 1 + 1

Ans. 4 : In order to release more energy to perform sudden activity, pyruvate is converted into lactic acid in the lack of oxygen. Formation of lactic acid in muscles cause cramps or fatigue. **2**

Ans. 5 : Difference between Aerobic and Anaerobic respiration :

S. No.	Aerobic Respiration	Anaerobic Respiration
(i)	Occurs in the presence of oxygen.	Occurs in the absence of oxygen.
(ii)	Releases large amount of energy.	Releases relatively small amount of energy.

During sudden physical activity, there is a lack of oxygen in our muscle cells, which causes the breakdown of pyruvate into lactic acid that develops cramps in the body. **2 + 1**
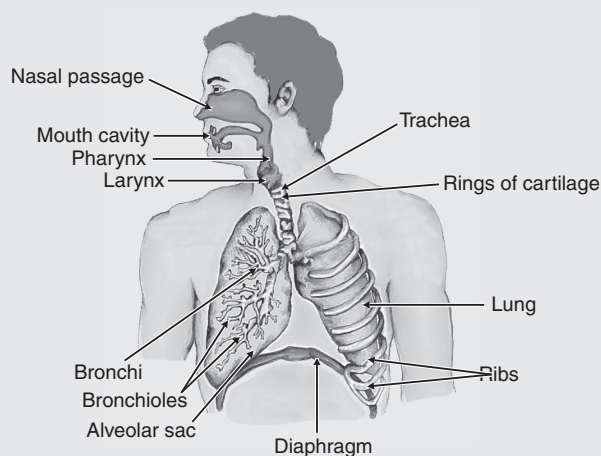
Ans. 6 : A terrestrial organsim can obtain oxygen directly from the air and have slow breathing rate but aquatic organisms have to obtain oxygen for respiration which is dissolved in water. Since, the amount of oxygen dissolved in water is fairly low as compared to the amount of oxygen in air. **3**

Ans. 7 :

(a)

4

(b) So that there is sufficient time for oxygen to be absorbed and for CO_2 to be released. 1

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TOPIC-3
Circulation and Transportation

SUMMATIVE ASSESSMENT   WORKSHEET-29

Ans. 1 : (a) Phloem   (b) Xylem.   ½ + ½

Ans. 2 : It is the loss of water in the vapour form from the exposed parts of a plant.   1

Ans. 3 : Transport of materials in Xylem : The movement of water and minerals absorbed by the plant roots from the soil through xylem elements-tracheids and vessels are transported to other plant parts. Transpiration helps in upward conduction.

Transport of materials in Phloem : Food synthesized in the leaves is transported through sieve tubes of phloem tissues to other parts both upwards and downwards.   **1 + 1**

Ans. 4 : (a) Xylem : Transport water and minerals in plants.   ½

(b) Pulmonary artery : Transport deoxygenated blood from heart to lungs.   ½

(c) Pulmonary veins : Transport oxygenated blood from lungs to heart.   ½

(d) Phloem : Transport synthesised food in plants.   ½

Ans. 5 : Xylem (vessels) of roots, stems and leaves are inter- connected to form a continuous column. Roots also take up mineral salts actively, water moves in and as a result, creating pressure which pushes the water up. Transpiration pull creates a suction force pulling up water.   **3**

Ans. 6 : (a) Xylem :

—Transport of water and mineral.

—Upward movement. (Unidirectional)

Phloem :

—Transport of food and hormones.

—Upward and downward movements (bidirectional).

(b) Transport of soluble food by phloem is called translocation.   **1 + 1 + 1**

Ans. 7 : (a) Two advantages :

➢ Helps in absorption and upward movement of water and minerals from roots to the leaves.   **1**

➢ Temperature regulation.   **1**

(b) (i)

S. No.	Transpiration	Translocation
(i)	Plays role in transport of water and minerals	It is a transport of soluble products of photosynthesis.
(ii)	Occurs through xylem by simple physical forces.	Occurs through phloem in the form of sucrose by utilising energy.

2

    (ii) Because plants have a large proportion of dead cells in many tissues, they have low energy needs. So they use a slow transport system. **1**

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SUMMATIVE ASSESSMENT   WORKSHEET-30

Ans. 1 : Ventricles have to pump blood into various organs. So, they have thicker walls than the walls of atria. **1**

Ans. 2 : They do not have thick walls because the blood flowing through them is no longer under pressure, instead they have valves which ensure that the blood flows in one direction. **1**

Ans. 3 : Transport of soluble product of photosynthesis or food from leaves to other parts of plants is called translocation.

For translocation, food molecules enter the part of the phloem called the sieve tubes where they can be transported upwards or downwards to all the parts of the plant including roots.

Translocation is achieved by utilising energy from the ATP that provides osmotic pressure required for upward and downward movement of food. **2**

Ans. 4 : Differences between arteries and veins :

S. No.	Arteries	Veins
(i)	They are thick walled.	They are thin walled.
(ii)	Arteries have no valves.	They have valves.
(iii)	Carry oxygenated blood except pulmonary artery.	Carry deoxygenated blood except pulmonary vein.

(any two) 1 + 1

Ans. 5 :

S. No.	Blood Vessels	Function
(i)	Arteries	They carry blood away from the heart to various organs of the body.
(ii)	Veins	They collect the blood from different organs and bring it back to the heart.
(iii)	Capillaries	Exchanges of material between the blood and surrounding cells takes place across the thin walls of capillaries.

[CBSE Marking Scheme, 2012]

Ans. 6 : The loss of water in the form of vapour from the aerial parts of the plants is known as transpiration. **1**

    Functions :

    (i) It helps in the absorption and upward movement of water and mineral dissolved in it from roots to the leaves. **1**

    (ii) It also helps in temperature regulation. **[CBSE Marking Scheme, 2014] 1**

Ans. 7 : (i) Meena is suffering from Anaemia. **1**

    (ii) She should take fruits and vegetables (Spinach) which are rich in iron. Iron is an essential component of haemoglobin and is required for its proper functioning. **2**

    Associated Value : The learners will be motivated to take the balanced diet, especially rich with protein and Iron to keep their haemoglobin level in the required range. **2**

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SUMMATIVE ASSESSMENT   WORKSHEET-31

Ans. 1 : Respiratory unit of lungs — Alveoli

Excretory unit of kidneys — Nephrons   ½+½

Ans. 2 : Osmoregulation is the maintenance of optimum concentration of water and salts in the body fluids.   **1**

Ans. 3 : The biological process which involves the removal of harmful metabolic wastes from the body is called excretion.   **1**

Unicellular organisms remove their waste by simple diffusion.   **1**

Ans. 4 : The two major component of human urine are :

(a) Urea, (b) Uric acid.   **1 + 1**

Ans. 5 : Some of the methods employed by plants to get rid of their excretory products are :

(i) Gaseous wastes (CO_2, water vapour, O_2) are removed through 'stomata' in leaves and 'lenticels' in stems and released to the air.

(ii) Plants get rid of excess water by transpiration.

(iii) Some waste products are stored as resins and gums.   **1 + 1 + 1**

Ans. 6 : The main functions of kidneys are :

(i) Nephrons are the basic filtration unit of human beings. It removes poisonous substances such as urea and other salts along with excess water from the blood and urine that is excreted out from the body.

(ii) It regulates the osmotic pressure / water balance of the blood.

(iii) It regulates pH of the blood.   **1 + 1 + 1**

Ans. 7 : (a)
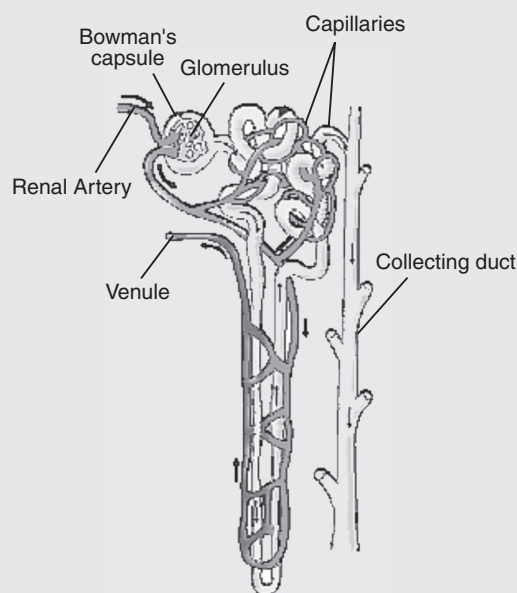
Uriniferous tubule with its blood vessels   **3**

(b) Function of nephron is filtration, reabsorption and secretion.   **1**

(c) Function of Artificial Kidney : Helps to remove harmful waste, extra salts and water, control blood pressure. Maintain the balance of sodium potassium salts in a patient whose kidneys have failed.   **[CBSE Marking Scheme, 2014] (any one) 1**

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SUMMATIVE ASSESSMENT

<div align="right">WORKSHEET-32</div>

Ans. 1 : High pressure causes the liquid part of blood to filter out from the glomerulus into the renal tubule. **1**

Ans. 2 : Animals, which live in dry conditions have to conserve water in their bodies. Therefore, they synthesise crystals of uric acid from their ammonia. **1**

Ans. 3 : It depends on the amount of :
    (a) Excess water present in the body. **1**
    (b) Dissolved waste to be excreted from the body. **1**

Ans. 4 : Strategies used by plants for excretion are :
    (a) They can get rid of excess water and oxygen through stomata. ½
    (b) Many plant waste products are stored in cellular vacuoles. ½
    (c) Waste products may be stored in leaves that fall off. ½
    (d) Waste products are stored as resin and gums, especially in old xylem. ½

Ans. 5 : Restricted blood flow to the kidney reduces kidney efficiency and can cause them to fail altogether. When this happens, urea and other wastes accumulate in the blood to dangerous levels, which can lead to death. Treatment of this case includes the use of an artificial kidney machine to clean the blood. An artificial kidney is a device to remove nitrogenous waste products from the blood through dialysis. **3**

Ans. 6 : During summer season, we lose a good amount of water through perspiration to keep our body temperature normal. While in winter, there is no perspiration. That is why, in summer season we drink a lot of water and pass urine fewer times. **3**

Ans. 7 : (i) Nephron. **1**
    (ii) When kidney fails, toxins start pooling up and the functioning of heart automatically decreases. Heart disease is largely caused by irregular lipid levels, which also lead to kidney problems. **2**
    (iii) **Functions :**
       (a) It helps in the ultrafiltration of urine.
       (b) It regulates the osmotic pressure/water balance of the blood. **2**

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PRACTICAL BASED QUESTIONS

<div align="right">WORKSHEET-33</div>

Ans. 1 : (D) Sunlight is necessary.
Ans. 2 : (C) KOH solution is correct solution for test.
Ans. 3 : (A) Testing of starch.
Ans. 4 : (C) Avoid sunlight.
Ans. 5 : (C) Because KOH solution tests the presence of CO_2 and absorbs CO_2.

Ans. 6 : (i) Epidermis on the aerial parts of plants often secrete a waxy, water resistant layer on their outer surface.
    (ii) They prevent water loss, mechanical injury and invasion by parasitic bacteria or fungi. **1+1**
<div align="right">(CBSE Marking Scheme 2015)</div>

Ans. 7 : (A) Chloroplast
    (B) Stomatal pore or stoma
    (C) Guard cell
    (D) Nucleus   ½ + ½ + ½ + ½

Ans. 8 : In the experiment, black paper covering prevents light. The inference is that light is necessary for photosynthesis. **1 + 1**

Ans. 9 : Precautions are :
    (i) Alcohol is highly inflammable and hence it should not be heated directly on the flame.
    (ii) Satisfactory results will not be obtained if the plant is not completely de-starched. **1 + 1**

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FORMATIVE ASSESSMENT

<div align="right">WORKSHEET-34</div>

Note : . Students should do this activity themselves.

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5 CONTROL AND CO-ORDINATION

TOPIC-1

Tropic Movements and Introduction of Plant Hormones

SUMMATIVE ASSESSMENT **WORKSHEET-35**

Ans. 1 : Gibberellins help in the growth of stem. **1**

Ans. 2 : The growth of pollen tube towards ovule. **1**

Ans. 3 : Nastic Movement : They are non-directional curvature movements of turgor or growth, when the movements are determined by the structure of the responding organ irrespective of the direction of structure which is generally diffused. *e.g.*, Drooping and folding of leaves in sensitive plant in response to shock (seismonasty).

Curvature Movement : They are changes in orientation of some plant parts in relation to others caused by intrinsic or external stimuli, *e.g.*, sleep movement or nyctinasty of legume leaves, bending of stem towards light. **1 + 1**

Ans. 4 : Stems are positively phototrophic and bend towards the direction of light. The movement is due to occurrence of more auxin on the darker side and lesser auxin on the illuminated side. As a result, there is more growth on the darker side which causes the stem to bend towards light. **2**

Ans. 5 :

    (a) (i) Positively phototropic — Shoot

        (ii) Negatively geotropic — Shoot

    (b) root

    (c) Shoot tip **[CBSE Marking Scheme, 2015] 1 + 1 + 1**

Ans. 6 :

Auxis formed in apical meristem

Auxin promotes cell enlargement

Auxin inhibits development of lateral bud

Auxin promotes cell division

Auxin formed in apical meristen
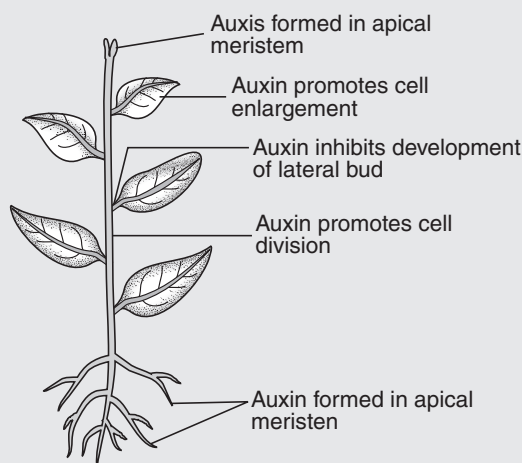
[CBSE Marking Scheme, 2014] 3

Ans. 7 : (a) Three growth hormones in plants are—

      (i) Auxin—It is synthesised in the young tip of roots and shoots. It promotes elongation and division of cell and root formation.

      (ii) Gibberellins—They help in the growth of the stem.

      (iii) Cytokinins—They promote cell division and delay leaf ageing.

    (b) The ability of a plant to detect change and respond to that change is termed as the sensitivity of the plant. Yet plants have no nervous system and no muscle tissue, they use electrical and chemical means to convey the information from one cell to another cell. The leaves of the sensitive plant (*Mimosa pudica*) folds up in response to touch. These leaf movements are independent of growth

whereas, the directional movement of the shoot of a germinating seedling breaking through the soil is growth dependent. **3 + 2**

SUMMATIVE ASSESSMENT WORKSHEET-36

Ans. 1 : Roots grow downwards, towards gravity while shoot usually grow upwards and away from earth. **1**

Ans. 2 : Abscisic acid inhibits the growth of plants. **1**

Ans. 3 : Movement of leaves of the sensitive plant or *Mimosa pudica* or touch–me–not is a response to touch (stimulus). The movement is not dependent upon growth of the plant, while the movement of shoot of a plant towards light is growth dependent movement. **2**

Ans. 4 : Auxins promote cell elongation and are present at the shoot tip.
When the tendril comes in contact with a support, auxin stimulates faster growth of the cells on the opposite sides. Thus, the tendril coils around the support. **2**

Ans. 5 : Phototropism : It is the growth which responds to a light stimulus. The cells on the plant that are farthest from the light have a chemical called auxin that reacts when phototropism occurs.

Activity to demonstrate Phototropism :

(a)

➢ Fill a conical flask with water.

➢ Cover the neck of the flask with a wire mesh.

➢ Keep two or three freshly germinated bean seeds on the wire mesh.

➢ Take a cardboard box which is open from one side.

➢ Keep the flask in the box in such a manner that the open side of the box faces light coming from a window.

➢ After two or three days, you will notice that the shoots bend towards light and roots away from light.

➢ Now turn the flask so that the shoots are away from light and the roots towards light.
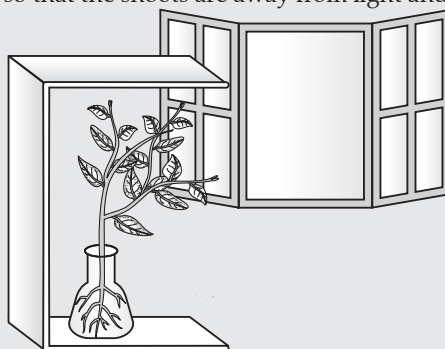
Geotropism : Plants show tropism in response to other stimuli as well. The roots of a plant always grow downwards while the shoots usually grow upwards and away from the earth. This upward and downward growth of shoots and roots, respectively in response to the pull of earth or gravity is, called geotropism.

Then in the figure below roots are positively geotropic while shoot part is negatively geotropic.

Negatively geotropic
Positively geotropic

➢ Leave it undisturbed in this condition for a few days.

(b) Folding up of the leaves of mimosa plant is an example of nastic movements or seismonasty.

[CBSE Marking Scheme, 2014, 2013] 2 + 1

Ans. 6   (i)   Plant hormones are known as phytohormones.   **1**

      (ii)   Auxin is synthesized at the shoot-tip of plant body.   **1**

      (iii) Examples :

          (a)   Auxins play a role in the development of seedless fruits.

          (b)   Gibberellin stimulates stem elongation.

          (c)   Ethylene promotes ripening of fruits.   **3**

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SUMMATIVE ASSESSMENT   WORKSHEET-37

Ans. 1 : Plant growth movements in response to stimuli from a particular direction are called tropic movements.   **1**

Ans. 2 : Abscisic acid. It makes the seed dormant in extremely dry season.   ½ + ½

Ans. 3 : In plants, the control and co-ordination is entirely chemical. In plants, chemical co-ordination is responsible for the growth and development. Plants responses are reflected in the form of movements. For example, movement occurs in the leaves of touch- me-not plant on being touched.   **2**

Ans. 4 : Auxins produced in the shoot tip move downwards in the plant. These auxins cause cell elongation in the growing tissues. In the tendrils, auxins move away from the point of contact with the supporting object. More growth occurs on the side away from the support. As a result of unequal growth on the two sides, the tendril coils around the support.   **[CBSE Marking Scheme, 2012] 1 + 1 + 1**

Ans. 5 : (a)   Plant hormones are the chemicals secreted by the plants which helps to co-ordinate growth, development and responses to the environment—   1

       Cytokinin   ½

      (b)   Auxin   ½

       When growing plant detects light, auxin is synthesized at the shoot tip and helps the cell to grow longer. When light comes from other side of the plant, auxin diffuses to shady side of the shoot.   **1**

       [CBSE Marking Scheme, 2012]

Ans. 6 : When growing plants detect light, a hormone called Auxin, synthesized at the shoot tip helps the cells to grow longer. When light is coming from one side of the plant, Auxin diffuses towards the shady side of the shoot. This concentration of Auxin stimulates the cells to grow longer on the side of the shoot which is away from light. Thus, plant appears to bend towards light.   **3**

       [CBSE Marking Scheme, 2012]

Ans. 7 :

S. No.	Mimosa Leaves	Tendril
(i)	Growth independent response.	Growth dependent response.
(ii)	It is a fast process.	It is a slow process.
(iii)	It is non-directional	It is directional

       [CBSE Marking Scheme, 2012] 1 + 1 + 1

Ans. 8 : Abscisic acid prevents wilting of leaves.   **1**

       Other Plant hormones :

       Cytokinin which promotes cell division   **1**

       Gibberellins which help in the growth of stem.   **[CBSE Marking Scheme, 2012] 1**

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TOPIC-2

Control and Co-ordination in Animals

SUMMATIVE ASSESSMENT   WORKSHEET-38

Ans. 1 : The timing and amount of hormone released are regulated.   **(CBSE Marking Scheme-2015) 1**

Ans. 2 : The two components of peripheral nervous system are—

      (i)   Cranial nerves

      (ii) Spinal nerves.   ½ + ½

Ans. 3 : Gastric Gland

Three components of secretion of gastric gland :
(i) Hydrochloric Acid
(ii) Mucus

(iii) Pepsin   **(CBSE Marking Scheme-2015) 2**

Ans. 4 : Sense organs are called receptors

(i)   tongue $\longrightarrow$ Gustatory receptors

(ii)   Nose $\longrightarrow$ Olfactory receptors   **1+½+½**

Ans. 5 : (i)   All respiratory organs have large surface area to get enough oxygen.

(ii)   They are thin-walled for easy diffusion of gases and substances.

(iii) They have rich supply of blood for transporting respiratory gases.   **1+1+1**

Ans. 6 : Response $\longrightarrow$ Reflex action.

(i)   A receptor to perceive the stimulus.

(ii)   A sensory or afferent nerve which carries the message from receptor to spinal cord.

(iii) The neurons of spinal cord transmit the impulse from afferent neurons to efferent neurons.

(iv)   Motor nerve carries message from spinal cord to the muscles that show response.   **1+2**

Ans. 7 : (a)   Pituitary gland secretes growth hormone. It regulates growth and development of the body. Adrenal gland secretes adrenaline hormone. It creates stress in our body.

(b)   The timing and amount of hormones released by various glands is controlled by feedback mechanism which is in built in our body, *e.g*, if sugar level in blood rises too high, it is detected by cells of pancreas which respond by producing and secreting more insulin into blood. As blood sugar falls to certain level, the secretion of insulin is reduced automatically.   **2+3**

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SUMMATIVE ASSESSMENT   WORKSHEET-39

Ans. 1 : Nervous tissue and muscular tissue   **½ + ½**

Ans. 2 : Hormone–Adrenaline, Adrenal gland.   **½ + ½**

Ans. 3 : The units which makes up the nervous system are called neurons.

(i)   End of dendrite tip of nerve cell.

(ii)   Dendrite $\longrightarrow$ cell body $\longrightarrow$ axon to its ends.

Ans. 4 : (i)   Hind brain

(ii)   Hind brain

(iii) Fore brain

(iv)   Fore brain.   **½+½+½+½**

Ans. 5 : The shape of muscles depends on ability to adapt to external forces, when placed under high demand, they generate great strength and power and maintain durability. Muscle is a soft tissue and their cells contain protein, filaments of actin and myosin that slide past one another, producing a contraction that changes both the length and shape of the cell.   **3**

Ans. 6 : (a)   Motor areas in brain send impulses to muscles and glands. It control the movement of voluntary muscles.

(b)   Involuntary actions.

(c)

1 + ½ + 1½
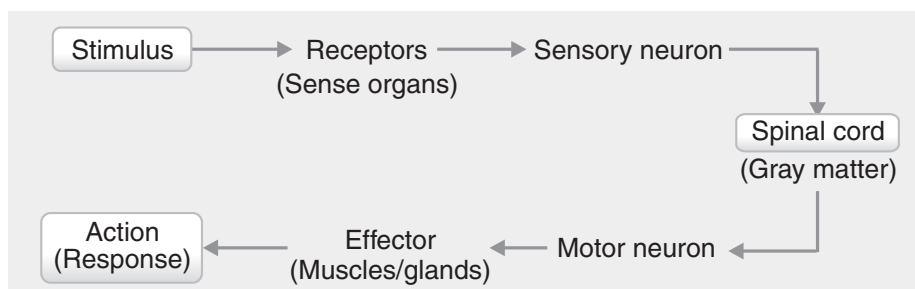
Ans. 7 :

(a) The pathway taken by nerve impulses in a reflex action is called the reflex arc :

A reflex arc showing cerebral reflex action

(b) Auxin : It promotes elongation and division of cell and root formation.
Gibberellins : They help in growth of stem.
Cytokinins : They promote cell division and delay leaf ageing.

Abscisic acid : It prevents wilting of leaves.   **3+2**
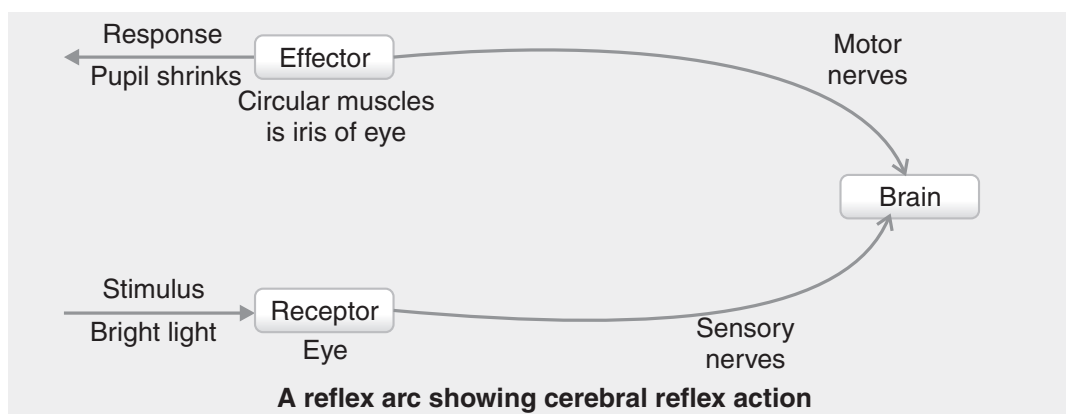
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SUMMATIVE ASSESSMENT   WORKSHEET-40

Ans. 1 : Receptors. They are located in sense organs.   ½ + ½
Ans. 2 : She will withdraw her hand immediately.
Name of the response—Reflex Action   ½ + ½

Ans. 3 : (i)   To pass information from receptors to brain.
(ii) Bony box which protects our brain.
(iii) Bony structure that protects the spinal cord.
(iv) To transmit information from brain or spinal cord to effector organ.   ½ + ½ + ½ + ½

[CBSE Marking Scheme, 2012]

Ans. 4 : The sensory area of brain receives information, interprets it and makes a rapid decision → message transmitted to motor area → motor neuron sends information to receptor organ → controlled by medulla in the hind brain.   **1 + 1**

Ans. 5 : (i)   Collects information from the surroundings.
(ii) Controls and co-ordinates the movement of muscles.
(iii) Helps to recognise smell, taste, vision, hearing etc. with the help of sense organs.   **1 + 1 +1**

Ans. 6 : (i)   Hormones are also known as chemical messengers as they act at a place different from the site of their manufacture.
(ii) Their hyper and hyposecretion may cause disorder.
(iii) They helps in control and co-ordination of the activities of living organism.   **1 + 1 + 1**

Ans. 7 : (a)   Reflex action : It is defined as an unconscious, automatic and involuntary response of effectors, *i.e.* muscles and glands, to a stimulus, which is monitored through the spinal cord.

Significance : The deep tendon reflexes provide information on the integrity of the central and peripheral nervous system. Generally, decreased reflexes indicate a peripheral problem, and lively or exaggerated reflexes a central one.

(b)   Plants produce hormones and respond to external stimuli, growing towards sources of water and light, which they need to survive. A tropism is a growth in response to a stimulus and an auxin is a plant hormone produced in the stem tips and roots, which controls the direction of growth.

1+2+2

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SUMMATIVE ASSESSMENT   WORKSHEET-41

Ans. 1 : Olfactory and Gustatory receptors.   ½ + ½

Ans. 2 : Cerebellum.   1

Ans. 3 : Timing and amount of hormone released are regulated by feed back mechanisms. If sugar level in blood rises, cells of pancreas detect and secrete more insulin which leads to the fall sugar level.   2

Ans. 4 : When an electrical signal reaches the axonal end of one neuron it releases certain chemical substances that cross the synapse and move towards the dendrite end of next neuron, generating another electrical signal.   1 + 1

Ans. 5 : Eye receive stimulus, *i.e.*, vision of ball. Receptor receives stimulus and stimulates nerve endings. Impulses are produced. Impulses travel along receptor neuron to the spinal cord. In the spinal cord, they are transmitted via synapse to relay neurons. Through another synapse impulses are transmitted from relay to effector neuron. Effector neuron receive decision from brain. Effector neuron moves to effector *i.e.*, arm. The bicep/tricep muscles arrange themselves for the response.   3

Ans. 6 : It is regulated by feedback mechanisms.
Example : Rise in sugar level in blood–insulin secreted by pancreas.
Fall in blood sugar level–insulin secretion is reduced.   **[CBSE Marking Scheme, 2013]** 1 + 1 + 1

Ans. 7 : (a)   Insulin : Regulates sugar metabolism, maintain blood sugar level.
Glucagon : Increases blood sugar level.   1
(b)   Blood takes adrenaline to its target sites : Our heart beats faster resulting in more supply of O_2 and glucose to our muscle. In liver, glycogen changes into glucose.   1
Breathing increases. This makes more O_2 available.
Blood supply **to** digestive system and skin is reduced and more blood to skeletal muscles.   1
(c)   The timing and amount of hormone released are regulated by feedback mechanism.   1
Example : When sugar level in blood rises - more insulin is secreted. Insulin removes extra glucose from the blood by converting into glycogen.   1
Falling glucose level reduces insulin secretion by pancreas.

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SUMMATIVE ASSESSMENT   WORKSHEET-42

Ans. 1 : Brain and spinal cord.   ½ + ½

Ans. 2 : Tongue and Nose.   ½ + ½

Ans. 3 : (a)   Reflex action is defined as an unconscious and involuntary response of effectors to a stimulus. 1
(b)   Involuntary action : Beating of heart, salivation in the mouth on chewing of tasty food.   1

Ans. 4 : There are three components of hind-brain—pons, cerebellum, medulla oblongata.
Functions of Pons : Relay centre, pneumotaxic area of respiratory centre.   1
Functions of Cerebellum : Maintains equilibrium and co-ordinates muscular activities.   1

Ans. 5 : (a)

2
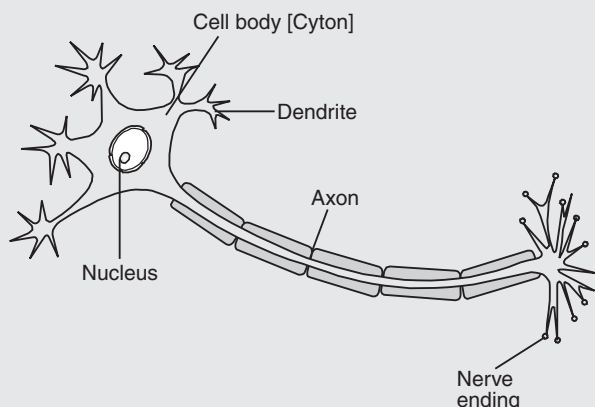
(b)   (i)   The information is acquired at the end of the dendrite tip of a nerve cell.   ½
(ii)   The information travels as an electrical impulse from the dendrite to the cell body and then along the axon to its end.   **[CBSE Marking Scheme, 2012]** ½

Ans. 6 : (a) The brain is situated in the cavity of a bony box called skull. The brain is contained in a fluid-filled balloon which provides further shock absorption. **1**

(b) The two main parts of hind-brain are :

(i) Cerebellum : It is responsible for precision of voluntary actions [and maintaining the posture and balance of the body.] **1**

(ii) Medulla Oblongata : All involuntary actions. [such as blood pressure, salivation, vomiting etc., are controlled by the medulla in the hind brain.] **[CBSE Marking Scheme, 2012] 1**

Ans. 7 : Two limitations are :

(i) They reach only those cells that are connected by nervous tissue and not each and every cell in the animal body. **1**

(ii) Once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit electrical impulse. **2**

Other means of communication is chemical communication or chemical co-ordination by compounds called hormones. **2**

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SUMMATIVE ASSESSMENT   WORKSHEET-43

Ans. 1 : Dendrite. **1**

Ans. 2 : Axon. **1**

Ans. 3 : During exercise, the body demands more energy and oxygen. To fulfill these demands, the breathing rate is automatically enhanced, the heart beats faster, thus sending a greater volume of oxygenated blood to the muscles. **2**

Ans. 4 : On touching a hot plate, first the sensory neurons are activated, which take the information to the brain or the spinal cord. Next, the motor neurons become active and bring the impulses from the brain to the muscles. In receiving these impulses, the muscles contract, and the hand is immediately removed from the hot plate. **2**

Ans. 5 : Reflex action is a sudden action in response to something in the environment. **1**

e.g., pulling out hand from the flame if accidently touched. **1**

The path of the reflex action is as follows :

Receptors ⟶ sensory neuron ⟶ spinal cord ⟶ motor neuron ⟶ effector **1**

[CBSE Marking Scheme, 2012]

Ans. 6 : (a) The hormone secreted by thyroid gland is thyroxin. It regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth. **1**

(b) Iodine is necessary for the thyroid gland to make thyroxin hormone. **1**

(c) The disease caused due to deficiency of iodine is Goitre. Its main symptom is swollen neck. **1**

[CBSE Marking Scheme, 2012]

Ans. 7 : (i) Hormone — adrenaline secreted by Adrenal gland. **½+½**

(ii) Physical Changes :

(a) Sweating, restlessness, tension

(b) Rapid heart beat

(c) Breathlessness. **3**

(iii) Suggestion : Deep breathing is the way by which we can get rid of negative feelings, in order to concentrate and visualise well. **1**

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FORMATIVE ASSESSMENT   WORKSHEET-44

Note : . Students should do this activity themselves.

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6 ELECTRICITY

TOPIC-1
Electric Current

SUMMATIVE ASSESSMENT **WORKSHEET-45**

Ans. 1 :

$$Q = 150 \text{ coulomb}$$
$$t = 1 \text{ min} = 60 \text{ s}$$
$$I = \frac{Q}{t} = \frac{150}{60} = 2.5 \text{ Ampere} \qquad 1$$

Ans. 2 : Electric current. **1**

Ans. 3 : The flow of electric charges across a cross-section of a conductor in unit time constitutes an electric current.

Electrons. **[CBSE Marking Scheme, 2013] 1 + 1**

Ans. 4 :

$$R = \frac{\rho l}{A} \qquad \frac{1}{2}$$

$$= \frac{2 \cdot 8 \times 10^{-8} \times 2}{1 \cdot 55 \times 10^{-6}} \qquad \frac{1}{2}$$

$$= \frac{2 \cdot 8 \times 2 \times 10^{-8-(-6)}}{1 \cdot 55}$$

$$= \frac{2 \cdot 8 \times 2}{1 \cdot 55} \times 10^{-2} = 0.36 \ \Omega \qquad \text{[CBSE Marking Scheme, 2013] 1}$$

Ans. 5 :

$$R = \frac{\rho l}{A}$$

$$10 = \frac{50 \times 10^{-8} \times 1}{A}$$

$$A = \frac{50 \times 10^{-8} \times 1}{10} = 5 \times 10^{-8} \ \text{m}^2 \qquad 3$$

Ans. 6 : Given, Radius = 0.01 cm = 0.01×10^{-2} m.

Resistivity $\rho = 50 \times 10^{-8} \ \Omega$m.

Resistance R = 10 Ω

$$R = \rho \frac{l}{A} = \rho \frac{l}{\pi r^2}$$

$$l = \frac{R \pi r^2}{\rho} = \frac{10 \times 3.14 \times 0.01 \times 10^{-2} \times 0.01 \times 10^{-2}}{50 \times 10^{-8}}$$

$$= \frac{314 \times 10^{-4}}{50 \times 10^{-8} \times 10^5}$$

$$\text{Length} = \frac{6.28 \times 10^{-4}}{10^{-3}} = 0.628 \ \text{m}. \qquad 3$$

Ans. 7 : (a) $\qquad R_1 = R_2 = 10\ \Omega$

(i) When connected in series

$$R_S = R_1 + R_2 = 20\ \Omega$$

$$P_S = \frac{V^2}{R_S} = \frac{6 \times 6}{20} = 1.8\ W \qquad\qquad\qquad\qquad 1$$

(ii) When connected in parallel

$$R_P = \frac{R_1 R_2}{R_1 + R_2} = \frac{10 \times 10}{10 + 10} = 5\ \Omega \qquad\qquad 1$$

$$P_P = \frac{V^2}{R_P} = \frac{6 \times 6}{5} = 7.2\ W$$

$$\frac{P_S}{P_P} = \frac{1.8W}{7.2W} = \frac{1}{4} = 1 : 4 \qquad\qquad\qquad\qquad 1$$

(b) Resistance of a conductor depends on :
  (i) length of the conductor $\qquad\qquad\qquad\qquad\qquad\qquad$ ½
  (ii) area of cross section $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ ½

(c)

S. No.	Ammeter	Voltmeter
1.	It is used to measure the current.	It is used to measure the potential difference.
2.	It is connected in series in the circuit.	It is always connected in parallel in the circuit.

(Any one difference) [CBSE Marking Scheme, 2012] 1

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SUMMATIVE ASSESSMENT $\qquad\qquad\qquad$ WORKSHEET-46

Ans. 1 : $\qquad\qquad n = \dfrac{q}{e} = \dfrac{1}{1.6 \times 10^{-19}} = 6.25 \times 10^{-18}\ C \qquad\qquad$ ½ + ½

Ans. 2 : Resistance. $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ 1

Ans. 3 : Factors on which the resistance of a cylindrical conductor depends :
  (i) Area of cross-section of the conductor. $\qquad\qquad\qquad\qquad\qquad$ ½
  (ii) Nature of the material. $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ ½
  $\qquad$ SI unit of resistivity is ohm-m. $\qquad\qquad$ **[CBSE Marking Scheme, 2012] 1**

Ans. 4 : Current remains same in series combination $\qquad\qquad\qquad\qquad$ ½

$$R_{series} = R_1 + R_2 + R_3 + R_4$$
$$(3 + 4 + 5 + 12) = 24\Omega \qquad\qquad\qquad\qquad 1$$
$$V = 12V$$
$$I = \frac{V}{R} = \frac{12V}{24\Omega} = \frac{1}{2} = 0.5A$$

[CBSE Marking Scheme, 2012] ½

Ans. 5 : $\qquad\qquad$ Work done = 10 Joule
$\qquad\qquad\qquad\qquad$ Charge = 2 Coulomb

$$\text{Potential of point A} = V_A = \frac{10\,J}{2C} = 5\ V$$

$\qquad\qquad$ Given, work done = 20 Joule
$\qquad\qquad\qquad\qquad$ Charge = 2 Coulomb.

$$\text{Potential of Point B} = V_B = \frac{20\,J}{2C} = 10\ V$$

Potential difference between two point A and B is
$$V = V_B - V_A$$
$$= 10\ V - 5\ V = 5\ V.$$
Work done directly from A to B.
$\qquad\qquad$ Work done = Potential difference $\times$ charge

$$= 5\,V \times 2\,C$$
$$= 10\ \text{Joule}$$

Ans. 6 : We know that work done = W = QV

$$\therefore \quad P = \frac{W}{t}$$

Now, $\qquad P = \dfrac{V}{t}$

$$V = IR \hspace{6cm} \textbf{1}$$

$$\therefore \qquad P = \frac{Q}{t}IR = I^2R$$

Energy = P × t

$$= I^2R \times t \hspace{5cm} \textbf{1}$$

$$= \frac{V}{R^2} \times R \times t$$

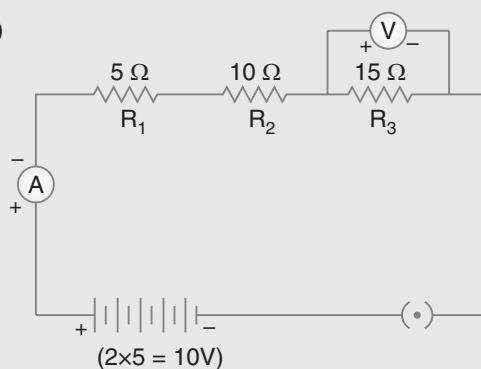$$= \frac{V^2}{R}t$$

$$\boxed{\text{Energy} = \frac{V^2}{R}t}$$

Where, V = voltage, R = resistance, t = time.

Ans. 7 : (i)

(2×5 = 10V)

$$\hspace{11cm} \textbf{½ + ½}$$

10 V battery; Rest components $\hspace{7.5cm}$ **1**

Equivalent resistance = $R_1 + R_2 + R_3$ $\hspace{6cm}$ **½**

$$= 5 + 10 + 15$$

$$= 30\ \Omega \hspace{8.5cm} \textbf{½}$$

Current in the circuit, I = $\dfrac{V}{R}$ $\hspace{7cm}$ **½**

$$I = \frac{10V}{30\Omega} = \frac{1}{3}\ \text{A or 0.33 A} \hspace{4.5cm} \textbf{½}$$

(ii) Potential difference across 5Ω resistor, V = IR $\hspace{4cm}$ **½**

$$= \frac{1}{3} A \times 5\,\Omega$$

$$= 1.67\ \text{V} \qquad \text{[CBSE Marking Scheme, 2012] } \tfrac{1}{2}$$

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SUMMATIVE ASSESSMENT   WORKSHEET-47

Ans. 1 : Length $\dfrac{1}{4}$ and area 4 times.

$$R = \rho\frac{l}{A} = \rho\frac{l}{4\times 4A} = \frac{R}{16}\ (\text{decreases}) \qquad \textbf{1}$$

Ans. 2 :

$$\frac{V^2}{R}\times t\ = 400$$

or $\qquad\qquad V^2 = 400$

or $\qquad\qquad V = 20\ \text{Volt.} \qquad\qquad\qquad\qquad\qquad\qquad \textbf{1}$

Ans. 3 :
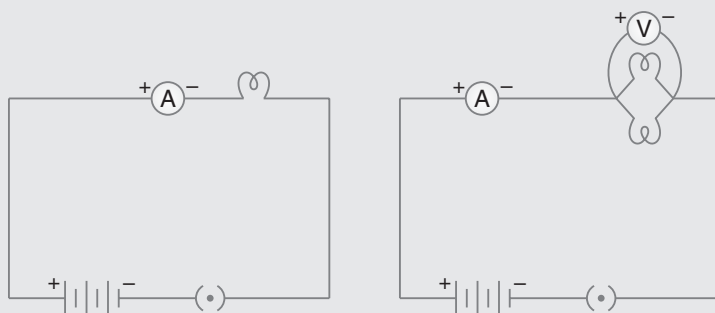
[CBSE Marking Scheme, 2012] **2**

Ans. 4 : $\qquad\qquad q = 2\text{C}$

$\qquad\qquad V = 12\text{V}$

$\qquad\qquad W = V \times q$

$\qquad\qquad\quad = 12\text{V} \times 2\text{C}$

$\qquad\qquad\quad = 24\ \text{J.} \qquad\qquad$ [CBSE Marking Scheme, 2012] **2**

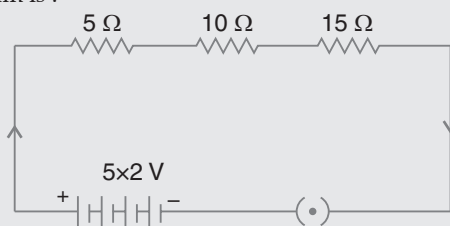**Ans. 5 :** The SI unit of resistance is ohm. $\hfill \tfrac{1}{2}$

One ohm is the resistance offered by a conductor when the current passing through it is one ampere and the potential difference across its ends is one volt. $\hfill \textbf{1}$

By Ohm's law, V = IR $\hfill \tfrac{1}{2}$

$$R = \frac{V}{I} = \frac{0.8V}{0.2A} = 4\ \text{ohm} \qquad \text{[CBSE Marking Scheme, 2012] } \textbf{1}$$

Ans. 6 : The required circuit diagram is :

Applied potential difference   1½

$$V = 5 \times 2 = 10 \text{ V}$$

Total resistance

$$R = 5 + 10 + 15 = 30 \, \Omega$$

Current, $I = \dfrac{V}{R} = \dfrac{10}{30} = 0.33$ A   **[CBSE Marking Scheme, 2012] 1½**

Ans. 7 : (i) When bulbs are connected in series, even if one bulb fuses or is removed, the others do not glow.   1

(ii) Advantages of connecting bulbs into parallel :

   (a) They get full battery voltage, so they all glow brightly.

   (b) They remain only at their conducting loop without affecting others.   2

(iii) Suggestions :

   (a) Less electrical appliances should be connected in parallel.

   (b) To use compact fluorescent appliances.   2

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SUMMATIVE ASSESSMENT   WORKSHEET-48

Ans. 1 : A closed conducting path through which electric charge may flow.   1

Ans. 2 : $\quad$ 1 ampere $= \dfrac{1 \text{ coulomb}}{1 \text{ second}}$ 1

Ans. 3 : (i) $\qquad$ P = 1200 W $\qquad$ t = 30 min = 0.5 h

Electrical energy (E) = P $\times$ t

$\qquad\qquad$ = 1200 $\times$ 0.5   1

$\qquad\qquad$ = 600W/h = 0.6 kWh.

(ii) Energy consumed is 30 days

$\qquad\qquad$ = 0.6 $\times$ 30 = 18 kWh   1

Cost of using 18 units = ₹ 4 $\times$ 18 = ₹ 72   **[CBSE Marking Scheme, 2012] 1**

Ans. 4 :

S. No.	Voltmeter	Ammeter
1.	Used to measure the potential difference.	Used to measure the current.
2.	Connected in parallel in the electric circuit.	Connected in series in the electric circuit.
3.	Has high resistance.	Has low resistance.

[CBSE Marking Scheme, 2012] 1 + 1

Ans. 5 : $\qquad$ We know, $R = \rho \dfrac{l}{A}$

When a wire is doubled by melting, its length would become double and area of cross-section would be halved *i.e.*, length of wire = 2l and area of cross-section = $\dfrac{A}{2}$.   1

Thus, we have $R_1 = \dfrac{2\rho l}{\dfrac{A}{2}} = \dfrac{4\rho l}{A}$

where R_1 is the new resistance.   1

Therefore, the new resistance of the wire is 4 R.

As resistivity of a material is the characteristic of a given material, hence it remains unchanged.   1
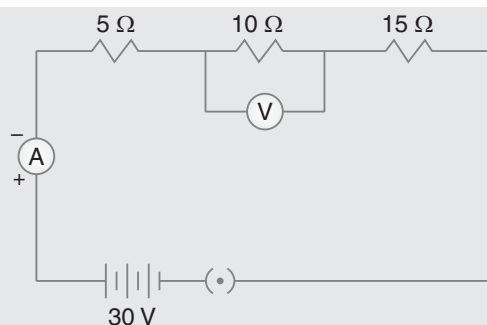
[CBSE Marking Scheme, 2012]

Ans. 6 :

$$P = \frac{V^2}{R} \therefore R = \frac{V^2}{P} = \frac{(240V)^2}{60W} = 960\ \Omega \qquad 1$$

$$P = \frac{V^2}{R} = \frac{(192V)^2}{960\ \Omega}\ 38.4\ W \qquad 1$$

$$I = \frac{V}{R} = \frac{192V}{960\Omega} = 0.2\ A \qquad \textbf{[CBSE Marking Scheme, 2011]}\ 1$$

Ans. 7 :

$$1$$

$$R = R_1 + R_2 + R_3 = 30\ \Omega \qquad 1$$
$$I = V/R = 30/30 = 1\ A \qquad \tfrac{1}{2}$$
$$V\ \text{across}\ 10\Omega = IR_2 = 1 \times 10 = 10\ V \qquad \textbf{[CBSE Marking Scheme, 2012]}\ \tfrac{1}{2}$$

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TOPIC-2

Resistance in Series and Parallel Combination, Electric Power and Heating Effect

SUMMATIVE ASSESSMENT **WORKSHEET-49**

Ans. 1 : Ohm metre (Ωm). 1

Ans. 2 : Tungsten has a high resistivity and a high melting point. So, most of the power consumed by this, is dissipated in the form of heat. 1

Ans. 3 : Reading of voltmeter = 15×0.05
= 0.75 volt. 2

Ans. 4 : The smallest value that can be measured by the measuring instrument is called its least count.

For example : if an instrument have 10 division starting from zero upto to mark 1 i.e. least count

$$= \frac{1}{10} = 0.1 \qquad 1+1$$

Ans. 5 : (i) These are good conductors of electricity/low resistance low resistivity.
(ii) Very high melting point and high resistivity.
(iii) Low melting point. 1+1+1

Ans. 6 : $\qquad Q = 90000, t = 1h = 3600s, V = 40V$
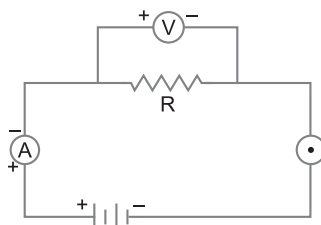
$$I = \frac{Q}{t} = \frac{90,000}{3,600} = 25A$$

$$R = \frac{V}{I} = \frac{40}{25} = 1.6\Omega$$

$$H = I^2Rt = 25 \times 25 \times 1.6 \times 3600$$
$$= 36 \times 10^5 \text{ J or 3600 kJ}$$
$$P = I^2R = 25 \times 25 \times 1.6 = 1000 \text{ W} = 1 \text{ KW.}$$

3

Ans. 7 :

The formula states that the current passing through a conductor is directly proportional to the potential difference across its ends, provided the physical conditions like temperature, density, etc. remain unchanged. This is Ohm's law.

$$I \propto V \text{ or } I = \frac{V}{R}$$

$$V = \pm R.$$

R is called resistance of the conductor.

As
$$V = 1.05 \text{ V}$$
$$I = 0.15 \text{ A}$$
$$V = IR$$
$$1.05 = 0.15 \times R$$
$$R = \frac{1.05}{0.15} = 7 \ \Omega$$

1+2+2

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SUMMATIVE ASSESSMENT   WORKSHEET-50

Ans. 1 : $R = \dfrac{V^2}{P}$.

1

Ans. 2 : 60 W bulb, because $R \propto \dfrac{1}{\rho}$.

1

Ans. 3 : (a)   To prolong the life of filament.

1

(b)   The maximum current that should flow in the circuit is 5A. If it exceeds this, the fuse will be blown off.   **[CBSE Marking Scheme, 2012] 1**
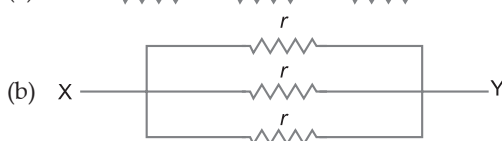
Ans. 4 :   Energy consumed $= P \times t = 800 \times 6 \times 30$
$$= 144000 \text{ Wh}$$
$$= 144 \text{ kWh.}$$

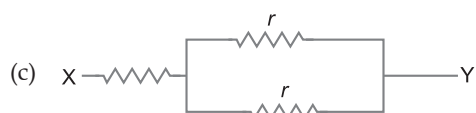Cost of electricity $= 144 \times 3 = ₹\ 432.$ **[CBSE Marking Scheme, 2012] 2**

Ans. 5 : (a)

½

(b)

½

(c) X —www— [r, r parallel] —Y   ½

(d) X —[r top; r, r bottom]— Y   ½
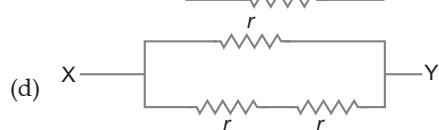
    (i) Circuit (a) have maximum resistance   ½
    (ii) Circuit (b) have minimum resistance   ½

Ans. 6 : $R = \dfrac{V^2}{W} = 24.2$

Yes, we can run electric geysor.
As, this rating is sufficient to run device because resistance is enough to control the fuse.

Ans. 7 : Definition of Electric current **:** Refer quick Review
S.I. Unit of Current-ampere
Definition of 1 Ampere **:** Refer Quick Review
Direction of Current from A to B - Justification
Justification **:** Refer to Quick Review

$$I = \frac{ne}{t} \quad \Rightarrow n = \frac{I \times t}{e}$$

$$= \frac{1A \times 1s}{1.6 \times 10^{-19} C} = 6.25 \times 10^{18}$$ **[CBSE Marking Scheme-2015] 5**

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SUMMATIVE ASSESSMENT   WORKSHEET-51

Ans. 1 : In a series connection of resistors, same current passes through all the resistors. Hence, current will
be same. Ratio of the current will be 1 : 1.   **1**

Ans. 2 : Kilowatt hour or kWh.   **1**

Ans. 3 : $I_1 = V/R_1 = \dfrac{220V}{1200\,\Omega} = 0.18$ Amp.

$I_2 = V/R_2 = \dfrac{220V}{100\,\Omega} = 2.2$ Amp.

[CBSE Marking Scheme, 2012] 1 + 1

Ans. 4 : (i) Current is constant in series combination, so it is impractical to connect a bulb and an electric
heater in series.   **1**
    (ii) When one component fails, the circuit is broken and none of the components work.   **1**
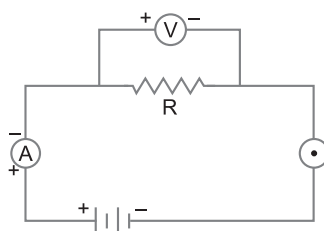**[CBSE Marking Scheme, 2012]**

Ans. 5 :   Power = VI
= 220 × 5 = 1100 Watt
= 1.1 kW
Cost per hour = 1.1 × 6
= 6.6   **1½+1½**

Ans. 6 : An electric fuse is a low resistance resistor that provides protection in the event of a overload curent.
It prevents the damage of various appliances in the household connections. It is should be placed on
live wire.   **1+1+1**

Ans. 7 : (a)

(b)
$$V = IR$$
$$V = 12 \text{ V}, I = 25 \text{ mA} \Rightarrow 2.5 \times 10^{-3} \text{ A}$$
$$12 = 2.5 \times 10^{-3} \times R$$

$$R = \frac{12}{2.5 \times 10^{-3}} = \frac{12 \times 10^3}{2.5} = 4.8 \text{ k}\,\Omega \qquad \textbf{3+2}$$

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SUMMATIVE ASSESSMENT WORKSHEET-52

Ans. 1 : In series. **1**

Ans. 2 : Rate at which energy is consumed is called electric power. Its unit is watt. ½ + ½

Ans. 3 : Quantity — Electric power ½

Unit — Watt ½

1 Watt is the power consumed by a device that carries

1 A of current when operated at a potential difference of 1 V. **[CBSE Marking Scheme, 2012] 1**

Ans. 4 : Factors — square of current, resistance of the given conductor, time for which the current flows.1½

Application — electric heating devices like electric iron or any other / electric bulb / electric fuse. ½

[CBSE Marking Scheme, 2012]

Ans. 5 : (i) Power/Electricity production involves burning of fossil fuel. Electricity save is fuel saved, less fuel burent means less air pollution.

(ii) Courage, appreciation and protection of environment.

(iii) Students should turn off the lights while going but of their class, they should not waste water as it also involves the use of electricity many times. **[CBSE Marking Scheme-2015] 1+1+1**

Ans. 6 : (i) 9Ω
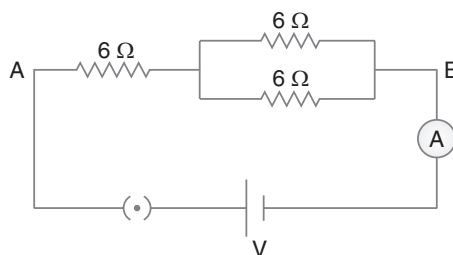
$$\frac{1}{R_4} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{6} + \frac{1}{6} = \frac{2}{6}$$

$$R_4 = 3\Omega$$
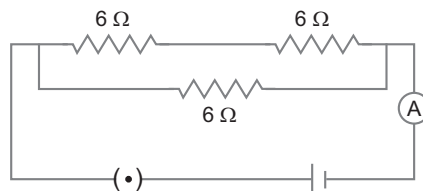$$R_5 = R_3 + R_4$$
$$\quad = 6 + 3$$
$$\quad = 9\Omega$$

In this circuit, equivalent resistance will be 9Ω.

(ii) 4Ω

$$R_4 = R_1 + R_2$$
$$\quad = 6\,\Omega + 6\,\Omega = 12\,\Omega$$

$$\frac{1}{R_5} = \frac{1}{R_3} + \frac{1}{R_4}$$

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

$$R_5 = \frac{12}{3} = 4\Omega.$$

In this circuit, equivalent resistance will be 4Ω. **1½ + 1½**

Ans. 7 : (a) Tungsten has a high melting point (3380°C). It does not melt at high temperatures. It retains as much of heat generated, so that it becomes very hot and emits light.

(b) Conductors of electric heating devices are made up of alloys because alloys do not oxidise readily at high temperatures, unlike metals. Also alloys have a greater resistivity as compared to their constituent pure metals.

(c) Because if one component fails, the circuit is broken and none of the other components will work. Also components need currents of widely different values to operate properly. But in a series circuit, the current is constant throughout the electric device.

(d) Resistance is inversely proportional to the area of cross-section of the wire. Thus, if the wire is thick, then resistance is less. If the wire is thin, then resistance is large.

(e) The commercial unit of electrical energy is kilo-watt hour.

$$1 \text{ kilowatt hour} = 1 \text{ Kw} \times 1\text{h}$$
$$= 10^3 \text{ W} \times 3600\text{s}$$
$$= 3.6 \times 10^6 \text{ Ws}.$$

or $$1 \text{ kwh} = 3.6 \times 10^6 \text{ J}$$ **1 + 1 + 1 + 1 + 1**

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PRACTICAL BASED QUESTIONS   WORKSHEET-53

Ans. 1 : (A) Resistance inversly varies. **1**
Ans. 2 : (C) Equal to 0.99. **1**
Ans. 3 : (C) Current decrease when resistance increases. **1**
Ans. 4 : (D) Resistor will get heated up and its value will change. **1**
Ans. 5 : (A) Number of cells used. **1**
Ans. 6 : K = Voltmeter, L = Rheostat, M = Ammeter, N = Key **½+½+½+½**

Ans. 7 : Resistance (R) $= \dfrac{V}{I} \dfrac{5.8 \text{ V}}{290 \times 10^{-3}} A = \dfrac{58 \times 1000}{290 \times 10}$

$\Rightarrow$ R = 20 Ω. **2**

Ans. 8 : (a) $\dfrac{3R}{2}$

Equivalent resistance in series (R$_s$) = R + R = 2R

Equivalent resistance in parallel, (R$_p$),

$$\frac{1}{R_p} = \frac{1}{R} + \frac{1}{R}$$

$$\frac{1}{R_p} = \frac{2}{R}$$

$\therefore$ $$R_p = \frac{R}{2}$$

$\therefore$ $$R_s - R_p = 2R - \frac{R}{2}$$ **2**

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FORMATIVE ASSESSMENT   WORKSHEET-54

Note : . Students should do this activity themselves.

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7 MAGNETIC EFFECTS OF ELECTRIC CURRENT

TOPIC-1

Magnetic Effects of Electric Current
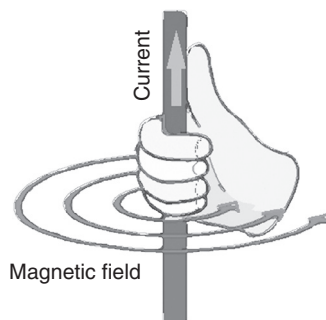
SUMMATIVE ASSESSMENT   WORKSHEET-55

Ans. 1 : Magnet, moving charges, electric current.   **(any two) [CBSE Marking Scheme, 2014]** ½+½

Ans. 2 : The force experienced by a current carrying conductor placed in a magnetic field is the maximum when conductor is kept perpendicular to the direction of the magnetic field.   **1**

Ans. 3 :

Hold the wire carrying current in your right hand, such that the thumb indicates the direction of current, then the folded fingers will indicate the presence of magnetic field (lines) surrounding the wire.   **1+1**

Ans. 4 : It depends upon :
  (a)   The direction of current through the conductor.   **1**
  (b)   The direction of magnetic field in which the conductor is placed.   **[CBSE Marking Scheme, 2013] 1**

Ans. 5 : Definition : A coil of large number of turns closely wound on a hollow cylinder of insulated material or otherwise is called a solenoid

d.
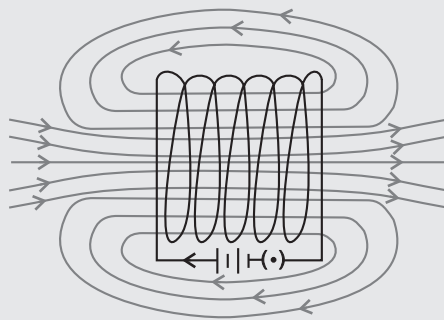
MAGNETIC FIELD LINES THROUGH AND AROUND A CURRENT CARRYING SOLENOID.

1½+1½

[CBSE Marking Scheme, 2015]

Ans. 6 : (i)   Towards south in upward direction.
  (ii)   Towards west in upward direction.
  (iii) Towards upward direction.   **1+1+1**

Ans. 7 : (i)
  (a)   When a bar magnet is pushed into the coil of insulated copper wire connected to a galvanometer, an induced current is set-up in the coil due to change of magnetic field through it. As a result, galvanometer gives a deflection (say towards left).   **1½**

(b) When the bar magnet is withdrawn from inside the coil, again an induced current is set up in the coil due to change of magnetic field through it. As a result galvanometer gives a deflection in the reverse direction. (say towards right). 1½

(c) If the bar magnet is held stationary inside the coil, then there is no induced current in the coil, because there is no change in magnetic field through it. As a result, galvanometer does not show any deflection. 1

(ii) By changing current in another coil placed near it. [CBSE Marking Scheme, 2012] 1

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SUMMATIVE ASSESSMENT   WORKSHEET-56

Ans. 1 : The angle between current carrying conductor and magnetic field is 90°. 1
[CBSE Marking Scheme, 2012]

Ans. 2 : Direction of motion of the conductor and direction of field. [CBSE Marking Scheme, 2012] 1

Ans. 3 : Using compass needle. When we move away from the straight wire, the deflection of the needle decreases which implies the strength of the magnetic field decreases. 1
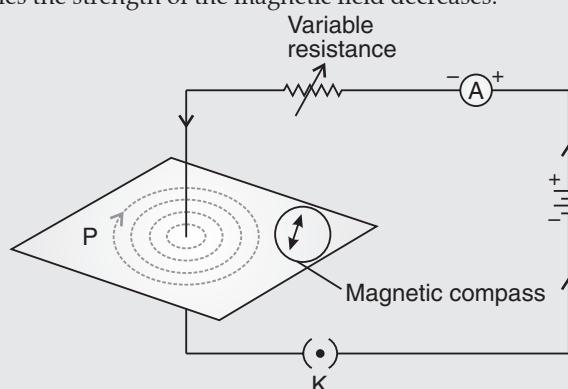
1
[CBSE Marking Scheme, 2012]

Ans. 4 : (i) Yes   (ii) No   ½+½

A beam of moving electrons constitutes electric current but neutrons are neutral, so no current and hence no magnetic field. [CBSE Marking Scheme, 2012] 1

Ans. 5 : An electromagnet is a solenoid coil that attains magnetism due to flow of current. It works on the principle of magnetic effect of current.
(i) To suspend magnetised bar and identify its north and south poles.
(ii) To find the polarity of electromagnet using the property-like poles repel. 1+1+1
[CBSE Marking Scheme, 2014]

Ans. 6 : (i) No, because, a charged particle at rest does not interact with magnetic field.
(ii) No, because, the force is zero if current and field are in the same direction.
(iii) Yes, because, the force is maximum when current and magnetic field are maximum. 1+1+1
[CBSE Marking Scheme, 2014]

Ans. 7 : Representation of the magnetic field. Path along which an imaginary free north pole would tend to move. The tangent at any point on the magnetic field line gives the direction of the magnetic field at that point.
(a) Emerge at north pole and merge at south pole. Inside the magnet, the direction of field lines is from south pole of magnet to its north pole, are closed curves.
(b) At the points where the magnetic field is stronger, field lines are crowded and vice-versa.

(c) No two magnetic field lines can intersect each other. **3**

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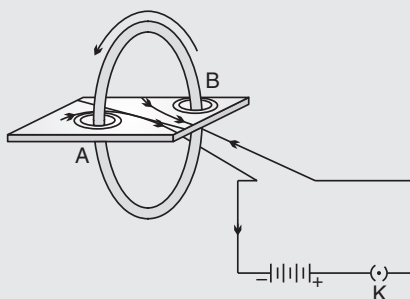
SUMMATIVE ASSESSMENT   WORKSHEET-57

Ans. 1 : The strength of the magnetic field increases.   [CBSE Marking Scheme, 2012] 1

Ans. 2 : Every current carrying conductor has a magnetic field around it.   [CBSE Marking Scheme, 2012] 1

Ans. 3 : Strength of magnetic field will be larger at A as the strength of magnetic field decreases when the distance is increased. Direction of magnetic field lines at A as well as B is anticlockwise because field lines are concentric circles and direction is determined by Right hand thumb rule.

[CBSE Marking Scheme, 2012] 2
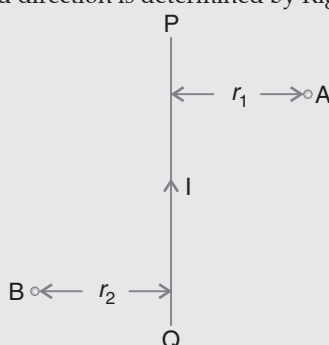
Ans. 4 : Right Hand Thumb Rule : Imagine holding the current carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then the fingers of right hand wrap around the conductor in the direction of field lines of the magnetic field.

[CBSE Marking Scheme, 2012] 2

Ans. 5 : The direction of induced current in a straight conductor is given by Fleming's right hand rule. It states that spread the thumb, forefinger and the middle finger of your right hand at right angle to one another in such a way that the forefinger points in the direction of magnetic field, thumb gives the direction of force, then the direction in which the middle finger points, gives the direction of induced current.

[CBSE Marking Scheme, 2014] 3

Ans. 6 : (a) The space around the magnet or current carrying conductor within which its influence can be felt by the magnetic substance.

Magnitude and direction.   **2**
(b) It would mean that at the point of intersection, compass needle would point to 2 directions which is impossible.   [CBSE Marking Scheme, 2013] 1

Ans. 7 : A magnetic field line is the path along which a free north pole tends to move.

Characteristics :

(a) Outside a magnet, the magnetic field lines are directed from N-pole of magnet towards S-pole. However, inside a magnet field lines are directed from S-pole to N-pole.

(b) The relative strength of magnetic field lines is given by degree of closeness of the field lines. More crowded field lines means a stronger field.

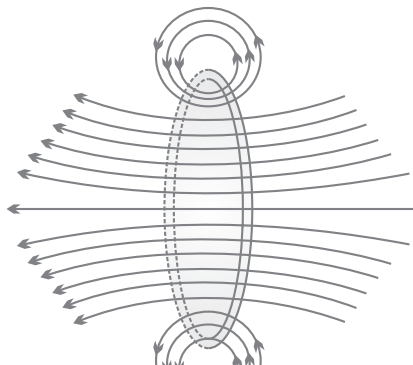(c) No two magnetic field lines can ever intersect each other. (any two)   **3**

Diagram : Magnetic field pattern of a current carrying circular loop.   **1+1**

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SUMMATIVE ASSESSMENT   # WORKSHEET-58

Ans. 1 : Bring a magnetic needle near the wire, a current carrying wire will produce a deflection in the needle whereas a wire without a current will not.   **[CBSE Marking Scheme, 2012] 1**

Ans. 2 :
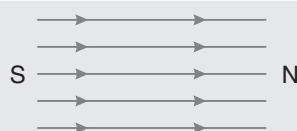
Uniform magnetic field inside a solenoid.   **[CBSE Marking Scheme, 2012] 1**

Ans. 3 : No, two magnetic lines of force never intersect each other. If two magnetic lines of force intersect each other than at the point of intersection there will be two different directions of magnetic field which is not possible.   **2**

Ans. 4 : The magnetic field due to a bar magnet is highest near its two poles. Therefore, the force exerted by the bar magnet on the compass needle is larger in such a region. That is why the deflection of the compass needle increases when it is moved towards the pole of a bar magnet.   **2**

Ans. 5 : (i)   Two magnetic field lines never interesect each other.

(ii)   Outside the magnet, the magnetic field lines are directed from North pole of magnet towards South pole.   **(any two) [CBSE Marking Scheme, 2012] 2+1**
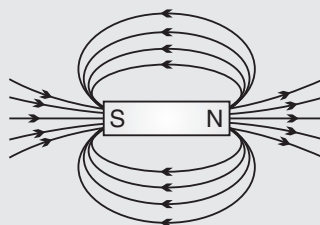
Ans. 6 : (a)   A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called solenoid.   **1**

(b)   Magnetic fields of a solenoid and a bar magnet are similar.   **2**
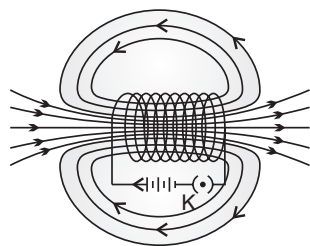
(c) A small aluminium rod suspended horizontally from a stand using two connecting wires. Place a strong horse shoe magnet in such a way that the rod lies between the two poles with the magnetic field directed upwards. For this put the north pole of the magnet vertically below and south pole vertically above the aluminium rod. Connect the aluminium rod in series with a battery, a key and a rheostat. Pass a current through the aluminium rod from one end to other. The rod is displaced towards left. When the direction of current flowing through the rod is reversed, the displacement of rod will be towards right.
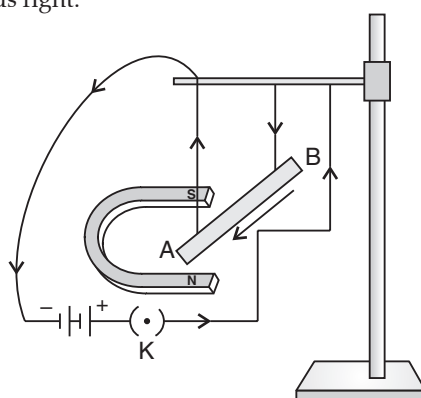
2
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TOPIC-2

Electric Generator, Electric Motor and Electric Current

SUMMATIVE ASSESSMENT   WORKSHEET-59

Ans. 1 : Live wire — Red, Neutral Wire — Black, Earth wire — Green.   **[CBSE Marking Scheme, 2015] 1**

Ans. 2 : Dry cell, car battery.   **[CBSE Marking Scheme, 2014] ½+½**

Ans. 3 : The two different current ratings provided in domestic circuits are 5A and 15A. This is because different electrical appliances have different power ratings, so they draw different currents when connected in the mains some appliances need smaller currents, while some other need heavy currents.
                    [CBSE Marking Scheme, 2013] 2

**Ans. 4 :** Overloading occurs when two many appliances of high power ratings are connected to a single electric circuit and switched on simultaneously. As a result, the circuit draws large current beyond its capacity. Short-circuiting takes place in domestic power supply if the live wire and the neutral wire come into direct contact, due to damage of insulation of live wire.   **[CBSE Marking Scheme, 2012] 1+1**

Ans. 5 : $$I = \frac{P}{V} = \frac{40W}{220V} = \frac{2}{11}A = 0.18 \text{ Amp.}$$

$\dfrac{2}{11}$ A or 0.18 A current is required by one lamp.

Current rating (Maximum current) = 5A.

∴ No. of lamps = $\dfrac{\text{Current rating}}{\text{Current through one lamp}}$

= $\dfrac{5}{0.18}$ = 27   **3**

Ans. 6 : Alternating Current : If the current changes direction after equal intervals of time, it is called alternating current. The positive and negative polarities of AC are not fixed.

Direct Current : If the current always flows in the same direction, it is called direct current. It can be obtained from a cell or a battery. The positive and negative polarities of DC are fixed for long distance transmission. AC is preferred as it caused minimum loss of energy during transmission.   **1+1+1**

Ans. 7 : (a) Alternating current : If the current changes the direction after equal intervals of time it is called Alternating current.

Direc current : If the current always flows in the same direction, it is called direct current.

(b) Source of AC current — electric generator.

Source of DC current — electric cell.

(c) Frequency of alternating current in India is 50 Hz.

(d) (i) Alternating current reverses its direction periodically but direct current always flow in one direction.

(ii) AC electric power can be transmitted over long distances without much less of energy while DC not.   **5**

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SUMMATIVE ASSESSMENT   WORKSHEET-60

Ans. 1 : In domestic circuit, it is A.C. while clock cell gives D.C.   **1**

Ans. 2 : A.C. can be easily transmitted over long distances without much loss of energy.   **1**
        [CBSE Marking Scheme, 2012]

Ans. 3 : A coil of many circular turns of insulated copper wire wrapped closely in the shape of cylinder is called a solenoid.   **1**

Two ways to increase the strength of the field of a solenoid :

(i) By increasing the number of turns.   **½**

(ii) By increasing current.   **[CBSE Marking Scheme, 2012] ½**

Ans. 4 : Earth wire is used as a safety measure especially for those appliances that have a metallic body, for example – electric press, toaster etc. The metallic body is connected to the earth wire, which provides a low resistance conducting path for the current. Thus it ensures that any leakage of current to the metallic body of the appliances keeps its potential to that of the earth and the user may not get a severe shock.   **[CBSE Marking Scheme, 2012] 2**

Ans. 5 : If too many electrical appliances of high power rating are switched on at the same time, they draw large current from the circuit. This is called overloading.

If the live wire and neutral wire come in contact either directly or via conducting wire, the situation is called short circuiting.

To avoid risk of electrical shock, the metal body of the appliances is earthed. Earthing means to connect the metal case of the appliance to earth by a means of a metal wire called earth wire.   **1+1+1**

Ans. 6 : It prevents the electric circuits and appliances from possible damage by stopping the flow of unduly high electric current.   **1**

Here, P = 2000 W, V = 220 V

Using P = VI

$I = \dfrac{P}{V} = \dfrac{2000}{220} = 9.09$ A.   **1**

Since the current flowing through the oven is larger than the fuse rating (5A), the fuse wire melts and breaks the circuit, thus protecting the circuit.   **[CBSE Marking Scheme, 2012] 1**
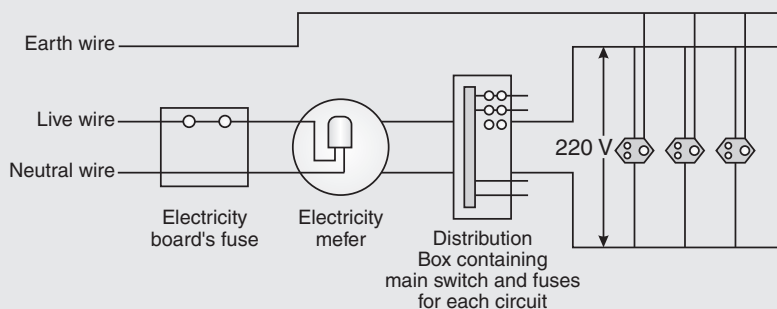
Ans. 7 : (a)

Fig. A schematic diagram of one of the common domestic circuits

(b) (i)   It prevents damage to applicance due to overloading or short-circuiting.

   (ii) Earth wire is connected to a metallic body burried deep inside earth. It is used as safety measure.

It provides a low resistance conducting path for the current any leakage of current to a metallic body does not give shock to user.   **[CBSE Marking Scheme-2015] 3 + 2**

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SUMMATIVE ASSESSMENT WORKSHEET-61

Ans. 1 : Live wire.   **[CBSE Marking Scheme, 2012] 1**

Ans. 2 : As the name suggests, direct current always flows in one direction and alternating current reverses its direction periodically.   **[CBSE Marking Scheme, 2012] 1**

Ans. 3 :

S. No.	Electric Motor	Generator
(i)	Motor converts electrical energy into mechanical energy.	Converts mechanical energy to electrical energy.
(ii)	Works on the princple of Fleming's left hand rule.	Works on the principle of Fleming's right hand rule.

[CBSE Marking Scheme, 2012] 1+1

Ans. 4 : Precautions :

   (i)   A fuse of appropriate rating should be used in the circuit.   ½
   (ii) Too many appliances should never be connected to a single socket.   ½

Overloading : **Occurs** when a large number of higher current drawing appliances are switched on at the same time and the total current drawn through the circuit exceeds its rated value.   ½

Short circuiting : Occurs when the live wire comes in direct contact with neutral wire.   ½

[CBSE Marking Scheme, 2012]

Ans. 5 : Electrical appliance – fan, washing machine, mixer.   **(any two) 1**

Fleming's Left Hand Rule – It states that ''Stretch the forefinger, the central finger and the thumb of your left hand mutually perpendicular to each other. If the forefinger shows the direction of the magnetic field and the central finger that of the current then the thumb will point towards the direction of motion of the conductor.   **[CBSE Marking Scheme, 2012] 2**

Ans. 6 : Direct current does not change its direction with time whereas alternating current reverses its direction periodically.   **1**

Most power stations produce AC in India/an AC generator.   **1**

Electric power can be transmitted over long distances without much loss of energy.   **1**

[CBSE Marking Scheme, 2012]

Ans. 7 : 'Electromagnetic' stands for the property by which magnetism developed by a current of electricity 'Induction' stands for the action or process of bringing about or giving rise to something.

Induced current depends on :

(i) The strength of magnetic field used.

(ii) The rate of change of magnetic flux associated with the coil.

(iii) The conductor in the form of coil of many turns of insulated wire.

Rule : Fleming right Hand Rule

Statement : Refer to Quick Review.

Application : Electric Generator.   **2+1½+1½**

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SUMMATIVE ASSESSMENT   WORKSHEET-62

Ans. 1 : Electric fuse.   **[CBSE Marking Scheme, 2012] 1**

Ans. 2 : (a) Alternating current

(b) Direct current.   **[CBSE Marking Scheme, 2012] ½+½**

Ans. 3 : Two advantages :

(i) To have equal potential difference across each appliance.   **1**

(ii) Each appliance has separate switch to ON / OFF the flow of current through it, so that each circuit can work independently.   **[CBSE Marking Scheme, 2012] 1**

Ans. 4 : (a) Strength of magnetic field is doubled and increases.   **1**

(b) Strength of magnetic field is doubled and increases.   **[CBSE Marking Scheme, 2012] 1**

Ans. 5 : Situation in which live and neutral wire come in direct contact, abruptly increasing the current in the circuit is called short–circuiting.   **1**

Factor – Insulation of wire is damaged / fault in appliance.   **½**

Safety device – electric fuse.   **½**

Electric fuse is an application of Joule's heating. If there is a current larger than the specified value the temperature of fuse wire increases and it melts to break the electric circuit and stop the flow of unduly high electric current.   **[CBSE Marking Scheme, 2012] 1**

Ans. 6 : (i) Live wire   **½**

(ii) Neutral wire   **½**

(iii) Earth wire   **½**

Earth wire, colour of insulation – green   **½**

The metallic body connected to the earth wire keeps its potential to that of the earth's zero potential and if there is any leakage the user does not get any kind of electric shock.   **1**

[CBSE Marking Scheme, 2012**]**

Ans. 7 : (a) The current whose direction gets reversed after every half cycle is called an alternating current or AC. There is no change in the direction of DC.

The most important advantage of using AC over DC is that in the AC mode electric power can be transmitted over long distances with less loss of power.

(b) Here P = 2kW = 2000W, V = 220 Volt

$$P = VI, \text{ the current } I = \frac{P}{V} 5 \frac{2000}{220} = 59.09 \text{ A}$$

As the current is 9.09 A, below the rating of fuse, the fuse will withstand *i.e.,* it will not blow off when AC is on.   **[CBSE Marking Scheme, 2014] 1**

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FORMATIVE ASSESSMENT   WORKSHEET-63

Note : . Students should do this activity themselves.

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8 SOURCES OF ENERGY

TOPIC-1

Sources of Energy

SUMMATIVE ASSESSMENT   WORKSHEET-64

Ans. 1 : Hot spots are placed within the mantle where rocks melt to generate magma. The presence of a hot spot within the Earth's mantle is a region of intense heat.   **1**

Ans. 2 : (i) Used for production and proliferation of nuclear weapons.
(ii) its generation is very expensive.   ½ + ½

Ans. 3 : (i) Hydrogen
(ii) Hydrogen sulphide
(iii) Methane
(iv) Carbon dioxide.   ½ + ½ + ½ + ½

Ans. 4 : Methane is the major constituent of biogas.   ½
Three characteristics to prove it as an excellent fuel :
(i) Smokeless
(ii) Leaves no residue
(iii) Higher heat of combustion.   ½ + ½ + ½

Ans. 5 : (i) Does large amount of work per unit volume or mass.
(ii) Easy to store and transport.
(iii) It should be economical and easily accessible.   **[CBSE Marking Scheme, 2014] 1 + 1 + 1**

Ans. 6 :

S. No.	Renewable Energy	Non-Renewable Energy
1.	Sources that can be regenerated.	Sources that will get depleted.
2.	These are inex-haustible sources.	These are exhaustible as they are limited.
3.	*eg.* energy from sun, wind.	*e.g.* coal, petroleum.

[CBSE Marking Scheme, 2014, 2013] 1 + 1 + 1

Ans. 7 : Hydrogen is not used as a common fuel because :
(i) When hydrogen is lighted, it burns with an explosion.   **1½**
(ii) It is very difficult to store and transport hydrogen.
Hydrogen as a fuel :   **1½**
Fuel cells are being developed that can store energy produced by burning hydrogen. Development of some materials that can absorb hydrogen and then release it at a steady rate.   **2**

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SUMMATIVE ASSESSMENT   WORKSHEET-65

Ans. 1 : Biogas, methane.   ½ + ½
Ans. 2 : Nitrogen and phosphorus.   ½ + ½
Ans. 3 : Slurry is used as a manure.   **1**
Slurry is rich in nitrogen and phosphorus.   **1**
Ans. 4 : Qualities of an Ideal Source of Energy :
(a) More heat per unit mass.   ½
(b) Less Pollution and smoke free.   ½
(c) Cheap and Economical.   ½
(d) Easily available and easily handled.   ½
(e) Safe to transport.   **(any four)**
Ans. 5 : An ideal source of energy has following qualities :
(i) Production of large amount of heat/energy.

(ii) Easily accessible and easy to store within less space.

(iii) Less or no production of toxic by products.   **1 + 1 + 1**

Ans. 6 : (i) It produces large amount of heat energy.

(ii) It is smokeless and pollution free.

(iii) It is easy to store and transport.   **1 + 1 + 1**

Ans. 7 : (i) Biogas.   **1**

(ii) Methane, Carbon dioxide.   **1**

(iii) Values **:**   **1**

     (a) It has high calorific value.

     (b) It burns without smoke.

     (c) It does not leave any residue.

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SUMMATIVE ASSESSMENT   WORKSHEET-66

Ans. 1 : Uranium–235.   **1**

Ans. 2 : Nuclear fusion   **1**

Ans. 3 : Charcoal is better fuel than wood because :

(a) It is smokeless and leaves no residue.

(b) It has a higher heat of combustion.   **1 + 1**

Ans. 4 : (a) Burning of coal or petroleum products lead to air pollution.

(b) The oxides of C, N and S are released on burning fossil fuels as acidic oxides. It leads to acidic rain and affect water and soil.   **1 + 1**

Ans. 5 : (a) Energy can be converted from one form to another.

(b) Energy in the usable form is dissipated to the surroundings in less usable form.

(c) Non-renewable source of energy is consumed and cannot be used again.

     [CBSE Marking Scheme, 2013] 1 × 3 = 3

Ans. 6 : Biomass : The waste of living organisms like cow dung, various plant materials like the residue after harvesting of crops, vegetable waste and sewage etc. form biomass.

During the decay of biomass, in the absence of oxygen, biogas is produced in the biogas plant. A slurry of cow dung and water is made in the mixing tank from where it is fed into the digester. In the digester tank, anaerobic micro-organisms decompose complex molecules of cowdung slurry and produce biogas.   **[CBSE Marking Scheme, 2012] 3**

Ans. 7 : (i) Indirectly or directly all forms of energy originate from the solar energy. Plants prepare their food by the solar energy. The solar energy forms clouds by evaporating water from lakes, rivers, oceans which come down to the surface in the form of rain and snow. The energy from flowing water is hydroelectricity.   **1**

(ii) Values of Solar Energy :

     (a) Drying clothes

     (b) To obtain salt from sea water

     (c) To get rid of moisture content in food grains.   **2**

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SUMMATIVE ASSESSMENT   WORKSHEET-67

Ans. 1 : Methane and hydrogen are two combustible components of biogas.   **1**

Ans. 2 : (i) Easily accessible and easy to store.   ½

(ii) Economical and ecofriendly.   ½

Ans. 3 : (a) Farmers can produce clean fuel from biowastes.

(b) Spent slurry is used as a best manure and can be used to generate electricity.   **1 + 1**

Ans. 4 : Two advantages of using nuclear energy are :

(a) Very small mass of Uranium yields tremendous energy.

(b) The released energy can be used to produce steam and further generate electricity.   **1 + 1**

Ans. 5 : The process is nuclear fission.   ½
Substances are uranium, plutonium, thorium.   ½
Advantages :
(i)   For a given amount of fuel, the amount of energy released is extraordinarily large.   ½
(ii) Nuclear power plants can be set up at any place.   ½
Hazards :
(i)   Improper nuclear waste storage and disposal result in environmental contamination.   ½
(ii) Further there is a risk of accidental leakage of nuclear radiation.   ½
[CBSE Marking Scheme, 2012]

Ans. 6 : (a)   Criteria for selecting a good fuel :
(i)   Would do a large amount of work per unit volume or mass.
(ii) be easily accessible.   **1**
(iii) be easy to store and transport. (any one)   **1**
(b)   Burning of fuels releases gases like CO_2, SO_2, NO_2.
These causes air pollution. With rain, these pollutants fall as acid rain and causes soil pollution.
[CBSE Marking Scheme, 2012] 1

Ans. 7 : (i)   Heat evolved during nuclear fission.   **1**
(ii) (a) Damage to property & life   **1**
(b)   Genetic disorder
(c)   Infertile soil   **2**
(iii) No, it is not good for environment as transferring nuclear fuel to an from plants represents a pollution hazard.   **1**
Associated Value : The learners will be more educated and careful towards safety measures against nuclear hazards.

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TOPIC-2
Alternative or Non-Conventional Sources of Energy

SUMMATIVE ASSESSMENT   WORKSHEET-68

Ans. 1 : 15 km/h.   **1**
Ans. 2 : Because fuel is used to produced heat energy by burning.   **1**
Ans. 3 : Four reasons we need to look for alternate sources of energy are :
(a)   Pollution due to fossil fuels.   ½
(b)   Exhausting fuel reserves.   ½
(c)   Increasing need.   ½
(d)   Replenishment is not easy.   ½
Ans. 4 : (a)   A combined arrangement of a large number of solar cells that can deliver sufficient electricity for practical use is known as solar cell panel.   **1**
(b)   Silver, Silicon.   ½ + ½
Ans. 5 : (i)   Pollution free and Eco-friendly
(ii) Easily accessible, easy to store and transport
(iii) Economical.   **1 × 3 = 3**
Ans. 6 : Large amount of fossil fuels are burnt everyday in power stations to heat up water to produce steam which further runs the turbine to generate electricity. Many thermal power plant is used since fuel is burnt to produce heat energy which is converted into electrical energy.   **3**
Ans. 7 : It is correct that a difference of 20°C in temperature of water at two levels can be exploited to generate electricity. For this purpose, Ocean Thermal Energy Conversion (OTEC) power plants are used. To use this plant, a difference of 20°C or more between the temperature of surface waters and water at depths of 1000 meters is required. In one of Ocean Thermal Energy Conversion system, the warm surface water is used to boil low boiling liquid like ammonia, or a chlorofluorocarbon. The vapours of

the liquid are then sent to move the turbines of generator. The cold water from the depths is used to cool the vapour escaped from the turbines and converted into liquid to be used again.   **5**

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SUMMATIVE ASSESSMENT   WORKSHEET-69

Ans. 1 : The fission of an atom of uranium produce 10 million times the energy produced by the combustion of an atom of carbon from coal.   **1**

Ans. 2 : Methane — 75%, CO_2 **1**

Ans. 3 : (a) Availability of the special grade silicon for making solar cells is limited.
(b) The process of manufacture is expensive, silver used for interconnections of the cells in the panel further adds to the cost.   **1 + 1**

Ans. 4 : (a) Hydrogen is comparatively a cleaner fuel than any other gaseous fuel, as on its burning only water is produced which does not pollute the environment.   **1**
(b) (i) Cannot be used in night/cloudy days.
(ii) Direction of reflector has to be changed from time to time.   **½ + ½**

Ans. 5 : Large amount of fossil fuels are burnt everyday in power stations to heat up water to produce steam which further runs the turbine to generate electricity. Many thermal plants are set up near coal or oil fields. In these plants fuel is burnt to produce heat energy which is converted into electrical energy.   **3**

Ans. 6 : (i) Non-renewable sources getting exhausted.
(ii) Increase in pollution.
Suggestions :
(a) Use more of renewable sources of energy
(b) Stop wasteful expenditure of energy.   **[CBSE Marking Scheme-2015] 1½+1½**

Ans. 7 : Renewable source of energy. Saving of electrical energy, money. Non-polluting.   **1**
Associated Value : The learners will appreciate the practice of adopting renewable sources of energy like CNG, biofuel, solar energy by the people.   **2**

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SUMMATIVE ASSESSMENT   WORKSHEET-70

Ans. 1 : (i) Environment friendly.
(ii) Efficient source of renewable energy.
(iii) No recurring expenditure. (any two)   **[CBSE Marking Scheme 2015] ½+½**

Ans. 2 : Solar energy and Wind energy.   **½ + ½**

Ans. 3 : He may not have used :
(a) Black painted A1 sheet to absorb heat radiations
(b) Black cooking vessel to absorb heat radiations
(c) Glass sheet - prevents the escape of heat radiation from the box instead of plastic sheet.
(d) Mirror plate reflects the sunlight to fall on the glass sheet.   **2**

Ans. 4 : The windmills which have been traditionally used are converted to wind energy farms, which contain a large number of windmills to increase our energy output. Hydropower plants are now associated with dams to produce electricity.   **1 + 1**

Ans. 5 : (i) It cannot be used in night and cloudy days.
(ii) Yes, Because it is pollution free, economical as nothing is to be paid for using solar energy, easy to handle and nutrients in the food do not get destroyed.
(iii) Values : Environmental care, helpfulness.   **1+1+1**

Ans. 6 : (i) Because it cooks food without paying for using solar energy.
(ii) Greenhouse effect.
(iii) Pollution free, economical, easy to handle.   **1+1+1**

Ans. 7 : Use of renewable sources of energy–Population control, Planting trees (afforestation)
(Any other point according to the student)   **2**
Associated Value : The learners will be encouraged to play their role as a responsible citizen in the conservation of energy resources.   **1**

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Ans. 1 : A number of windmills erected over a large area. **1**

Ans. 2 : (i) Environment friendly

(ii) Efficient source of renewable energy **½ + ½**

Ans. 3 : Concave mirror is best suited for use in a solar cooker. This is because it is a converging mirror and converges large amount of light of sun into the solar cooker. **2**

Ans. 4 : Hydel power, as water is replenished by water cycle. Wind power, as wind keeps blowing due to uneven heating of earth by the sun. **2**

Ans. 5 : (i) Advantage : It is economical to use solar water heater because nothing is to be paid for using solar energy.

Limitation : It cannot be used at night and during cloudy weather.

(ii) Kapil's contribution towards conservation of environment is nature friendly because he is saving fossil fuels, which is non-renewable sources of energy, by this practice and also reducing pollution.

(iii) Environmental concern, avoidance of wastage of energy. **1+1+1**

Ans. 6 : (i) Charcoal can be produced by cutting trees, 1 kg of wood on destructive distillation produces only 0.25 kg of charcoal.

(ii) (a) Charcoal has high calorific value.

(b) Charcoal do not produce any smoke.

(iii) No regard for environment, disregard for health. **1+1+1**

Ans. 7 : The underground water comes in contact with 'hot spots' present in the earth's crust and steam is generated. This energy possessed by the hot water below the earth is called Geothermal energy. **1**

It can be used to produce electricity. **½**

S. No.	Thermal Power Plant	Geothermal Power Plant
1.	Uses coal as fuel.	Uses underground hot water.
2.	Causes pollution.	Does not cause pollution
3.	The fuel used is very expensive.	The fuel is free of cost.

[CBSE Marking Scheme, 2012] ½ × 3 = **1½**

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FORMATIVE ASSESSMENT   WORKSHEET-72

Note : . Students should do this activity themselves.

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