

# MT EDUCARE LTD.

## SUMMATIVE ASSESSMENT - 1 2013-14

CBSE - X

Set - B

Roll No. 

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Code No. **32/1**

**Series RLH**

- Please check that this question paper contains 7 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 41 questions.
- Please write down the serial number of the question before attempting it.

## SCIENCE (Theory)

**Time allowed** : 3 hours

**Maximum Marks** : 90

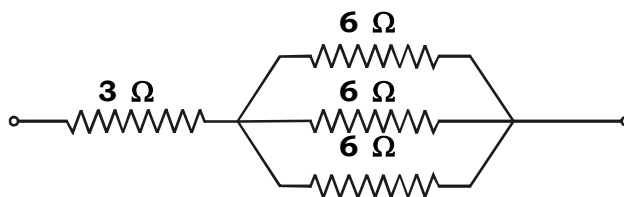
### General Instructions :

- i) The question paper comprises of two sections A and B, you are to attempt both the sections.
- ii) All questions are compulsory.
- iii) All questions of section A and all questions of section B are to be attempted separately.
- iv) Question numbers 1 to 3 in section A are one mark question. These are to be answered in one word or one sentence.
- v) Question numbers 4 to 7 are two mark questions, to be answered in about 30 words.
- vi) Question numbers 8 to 19 are three mark questions, to be answered in about 50 words.
- vii) Question numbers 20 to 24 are five mark questions, to be answered in about 70 words.
- viii) Question numbers 25 to 42 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four provided to you.

## SECTION - A

1. Which has more resistance: 100W bulb or 60W bulb? **1**
2. Why cytokinins are present in greater concentration in areas of rapid growth ? **1**
3. Which part of the solar cooker is responsible for green house effect. **1**
4. Consider the following displacement reactions : **2**
  - i)  $\text{Fe(s)} + \text{CuSO}_4(\text{aq}) \longrightarrow \text{FeSO}_4(\text{aq}) + \text{Cu(s)}$
  - ii)  $\text{Zn(s)} + \text{FeSO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{Fe(s)}$State, out of three metals Zn, Cu and Fe which is the least reactive and which is the most reactive ?
5. Why does  $\text{CO}_2$  turn lime water milky ? What happens when excess of  $\text{CO}_2$  is passed and why ? **2**
6. How much work is done in moving a charge of 3 coulomb from a point at the volts 115 to a point at 125 volts? **2**
7. What is a solar cell? Name two materials mostly used for making solar cells. **2**
8. How is bleaching powder prepared ? Why does bleaching powder **3**
  - (i) smell strongly of chlorine ?
  - (ii) not dissolve completely in water ?
9. Differences in physical properties of metals and non metals. **3**
10. Give the important properties of ionic compound. **3**
11. Translate the following statments into balanced chemical equation : **3**
  - i) Calcium carbonate on heating gives calcium oxide and carbon dioxide.
  - ii) Phosphorus reacts with chlorine to give phosphorus pentachloride.
  - iii) Carbon disulphide burns in air to give carbon dioxide and sulphur dioxide.
12. What is an electromagnet? Mention the differences between an **3**  
electromagnet and a permanent magnet.

13. i) What do you mean by electromagnetic induction? **3**  
 ii) A straight wire carrying electric current is moving out of plane of paper and is perpendicular to it. What is the direction and type of induced magnetic field?  
 iii) Can a 5 A fuse be used in wire carrying 15 A current? Why?
14. i) It is established that an electric current through a metallic conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving (a) alpha particles, (b) neutrons? Justify your answer. **2**  
 ii) Meena draws magnetic field lines of field close to the axis of a current carrying circular loop. As she moves away from the centre of the circular loop she observes that the lines keep on diverging. How will you explain her observation? **1**
15. 'Respiration is a vital function of the body'. Justify. **3**
16. Give reasons for the following : **3**  
 i) Pituitary is often termed as master endocrine gland.  
 ii) Adrenals are known as glands of emergency.
17. (a) Which part of neuron (nerve cell) receives the information ? **3**  
 (b) Name the minute gap between two adjacent neurons lined end to end.  
 (c) Give general name of the chemicals that transmit nerve impulse across the minute gap between two adjacent neurons lined end to end.
18. Which type of nuclear process is currently used in nuclear electricity generators? Give one example each for the substances used in this context as (i) coolants (ii) moderators **3**
19. Calculate resistance in the following combination of resistances. **3**



20. Write the steps in balancing a chemical reaction. **5**  
 Iron + water  $\longrightarrow$  iron oxide (II, III) + hydrogen

OR

What the types of decomposition reaction? Explain the electrolysis of water with neat labelled diagram. **5**

21. Give the importance of pH in everyday life. **5**

**OR**

(a) Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9 respectively. **3**

i) Which solution is

(a) neutral ?

(b) strongly alkaline ?

(c) strongly acidic ?

(d) weakly acidic ?

(e) weakly alkaline ?

ii) Arrange the pH in increasing order of hydrogen ion concentration.

(b) Do basic solutions also have  $H^+$  (aq) ions ? If yes, then why are these basic ? **2**

22. i) Draw the magnetic field lines due to current carrying solenoid. **5**

ii) What are the factors affecting the strength of an electromagnet.

**OR**

i) What is meant by the term 'magnetic field'? **1**

ii) What produces magnetic field in the human body? **1**

iii) Explain why two magnetic field lines do not intersect each other. **2**

iv) Draw a neat diagram of magnetic field lines around a bar magnet. **1**

23. i) What is an electromagnetic induction. **1**

ii) What are the two ways to induce current in a coil? **2**

iii) What is a fuse ? On what effect of electric current does it work? **2**

**OR**

(a) Explain an activity to show that a current carrying conductor experiences a force when placed in a magnetic field. **5**

(b) State the rule which gives the direction of force acting on the conductor.

(c) An electron moves perpendicular to a magnetic field as shown in the figure. What would be the direction of force experienced on the electron?

24. (i) Mention the excretory products in animals. **5**

(ii) Name various excretory organs in higher animal.

(iii) Draw a well labeled diagram of excretory system of man.

**OR**

(i) Name the outermost covering of human heart. **5**

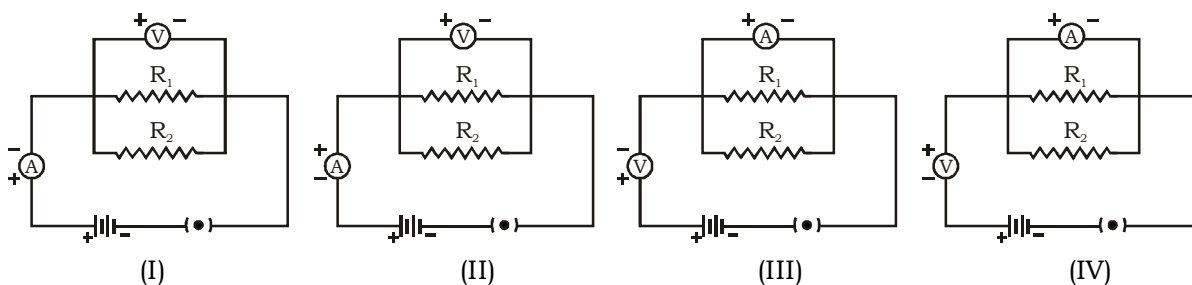
(ii) Name the valves present at the junction of

- (a) Right auricular - ventricular aperture
- (b) Left auricular - ventricular aperture
- (iii) Name the blood vessel
  - (a) Through which exchange of materials takes place
  - (b) Which has valves.

**SECTION - B**

25. Which of the following metal exists in the liquid state? 1
- (a) Na
  - (b) Ag
  - (c) Cr
  - (d) Hg
26. Calamine ore can be used to extract one of the following metals. This metal is.. 1
- (a) Copper
  - (b) Mercury
  - (c) Aluminium
  - (d) Zinc
27. The sign used to indicate a reversible reaction is ..... 1
- (a)  $\rightarrow$
  - (b)  $\rightleftharpoons$
  - (c)  $\leftarrow$
  - (d)  $\rightleftharpoons$
28.  $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$  is an example of ..... 1
- (a) neutralization reaction
  - (b) redox reaction
  - (c) double displacement reaction
  - (d) decomposition reaction
29. In the reaction : 1
- $\text{BaCl}_2 + \text{ZnSO}_4 \longrightarrow \text{ZnCl}_2 + \text{BaSO}_4$ , the white precipitate seen is due to .....
- (a)  $\text{ZnCl}_2$
  - (b)  $\text{BaSO}_4$
  - (c)  $\text{BaCl}_2$
  - (d)  $\text{ZnSO}_4$
30. An acid is ..... 1
- (a) a proton donor
  - (b) a proton acceptor
  - (c) electron donor
  - (d) electron acceptor
31. A weak acid in solution is ..... 1
- (a) mostly molecules
  - (b) mostly ions
  - (c) both molecules and ions
  - (d) less water
32. A battery of 12V is connected in series with resistors of 0.2 ohm , 0.3 ohm,0.4 ohm,0.5 ohm and 12 ohm. How much current would flow through the 0.3 ohm resistor : 1
- (a) 0.895A
  - (b) 1.11A
  - (c) 0.5A
  - (d) none of these

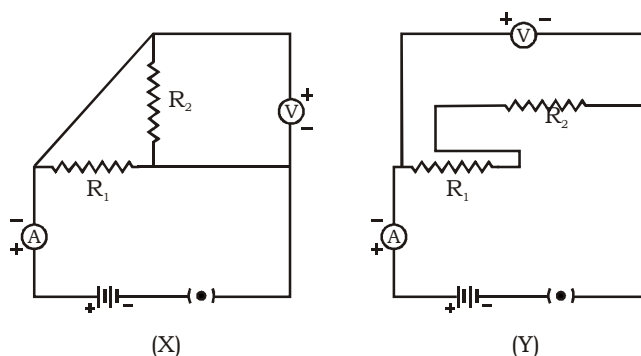
33. Among which of the following resistance does not depend : 1  
 (a) length of conductor (b) area of cross-section  
 (c) temperature (d) density
34. The total work done by an electrical appliance during its operation, is called electrical 1  
 (a) Current (b) Power  
 (c) Energy (d) Potential
35. In the experiment on finding the equivalent resistance of two resistors, connected in parallel, the voltmeter and the ammeter have been correctly connected in circuit. 1



- (a) I only (b) II only  
 (c) III only (d) IV only

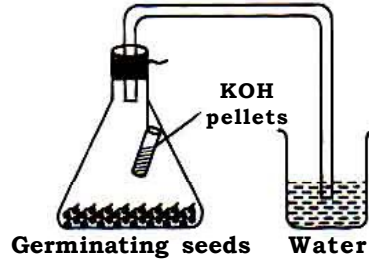
36. The only correct statement for the two circuits (X) and (Y) shown below is : 1  
 (a) The resistors R1 and R2 have been connected in series in both the circuits.

- (b) The resistors R1 and R2 have been connected in parallel in both the circuits.  
 (c) In the circuit (X) the resistors have been connected in parallel whereas these are connected in series in circuit. (Y)



- (d) In the circuit (X) the resistors R1 and R2 are connected in series while these are connected in parallel in circuit. (Y)

37. In the following set up which shows that “carbon dioxide is given out during respiration”, the KOH kept in the flask : **1**



- (a) make the air in the flask alkaline.  
 (b) creates partial vacuum in the flask.  
 (c) absorbs moisture presents in the flask.  
 (d) Provides oxygen for respiration to the germinating seeds.
38. Which one of the following is not a function of stomata ? **1**
- (a) Respiration (b) Photosynthesis  
 (c) Transpiration (d) Translocation
39. Seeds which are kept in a conical flash in an experiment to prove that CO<sub>2</sub> is released during respiration must be **1**
- (a) Washed (b) Dry  
 (c) Germinating (d) Boiled
40. A leaf is boiled in alcohol before using iodine for starch test in order to : **1**
- (a) dissolve starch (b) dissolve chlorophyll  
 (c) soften the leaf (d) to kill the enzymes
41. While preparing a temporary stained mount of a leaf epidermal peel the extra stain is removed by : **1**
- (a) Washing with water (b) Washing with alcohol  
 (c) Absorbing with filter paper (d) Absorbing with cotton
42. The word ‘sapro’ means : **1**
- (a) Cell sap (b) Dead  
 (c) Other (d) Rotten

<b>CBSE X</b>	<b>MT EDUCARE LTD.</b>	<b>Set - B</b>
	SUBJECT : <b>SCIENCE</b>	Marks : 90
Date :	<b>SUMMATIVE ASSESSMENT - 1</b>	
	<b>MODEL ANSWER PAPER</b>	Time : 3 hrs.

<b>SECTION - A</b>		
1.	As R is inversely proportional to P for constant V. Thus, the resistance of 60W bulb is more.	<b>1</b>
2.	Because they promote cell division.	<b>1</b>
3.	Glass sheet.	<b>1</b>
4.	In reaction (i), Fe displaces Cu from CuSO <sub>4</sub> solution. Hence, Fe is more reactive than Cu. In reaction (ii) Zn displaces Fe from FeSO <sub>4</sub> solution. Hence, Zn is more reactive than Fe. From reactions (i) and (ii), we conclude that Zn is more reactive than Fe which is more reactive than Cu. Thus, Zn is the most reactive while Cu is least reactive of the three.	<b>2</b>
5.	CO <sub>2</sub> reacts with lime water to form insoluble CaCO <sub>3</sub> which appears as a white precipitate. $\text{Ca(OH)}_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$ Lime water On passing excess of CO <sub>2</sub> , Ca(HCO <sub>3</sub> ) <sub>2</sub> which is a soluble compound. $\text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O} \longrightarrow \text{Ca(HCO}_3)_2$ Calcium hydrogen carbonate	<b>2</b>
6.	Potential difference V= 125 – 115=10 volts Charge Q = 3 coulomb $V = \frac{W}{Q} \quad W = v \times Q = 10 \times 3 = 30 \text{ Joules.}$	<b>1</b>  <b>1</b>
7.	A solar cell is a device which converts solar energy directly into electric energy. Silicon and germanium are the two most commonly used materials for making solar cells.	<b>1</b>  <b>1</b>



8.	<p>Bleaching powder is prepared by the action of <math>\text{Cl}_2</math> on dry slaked lime.</p> $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$ <p>Bleaching powder smells strongly of chlorine because it is loosely bound to slaked lime. Carbondioxide present in the air combines with bleaching powder liberating chlorine.</p> $\text{Ca OCl}_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{Cl}_2 \uparrow$ <p>Bleaching powder reacts with water as under :</p> $\text{Ca OCl}_2 + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{Cl}_2$ $\text{Ca}(\text{OH})_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$ <p>Calcium carbonate is an insoluble substance. Hence, bleaching powder does not dissolve in water completely.</p>	3				
9.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Metals</th> <th style="width: 50%; text-align: center;">Non-metals</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">           1. Metals exists as solids at room temperature (except mercury - liquid state)            2. Metals have metallic lustre and can be polished.            3. Metals are hard (except sodium and potassium)         </td> <td style="vertical-align: top;">           1. Non-metals exist in all three states – solids, liquids and gases.            2 Non-metals have no lustre i.e. they are dull (except iodine) and cannot be polished.            3. Solid non-metals are soft (except Diamond an allotrope of carbon).         </td> </tr> </tbody> </table>	Metals	Non-metals	1. Metals exists as solids at room temperature (except mercury - liquid state) 2. Metals have metallic lustre and can be polished. 3. Metals are hard (except sodium and potassium)	1. Non-metals exist in all three states – solids, liquids and gases. 2 Non-metals have no lustre i.e. they are dull (except iodine) and cannot be polished. 3. Solid non-metals are soft (except Diamond an allotrope of carbon).	3
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10.	<p>The important properties of ionic compound are as follows :</p> <p><b>Physical Nature</b></p> <ul style="list-style-type: none"> <li>◆ Ionic compounds are solids. The ionic compounds are solids and relatively hard. These compounds are generally brittle and break into pieces when subjected to pressure.</li> </ul> <p><b>Melting And Boiling Points</b></p> <ul style="list-style-type: none"> <li>◆ The melting and boiling points of electrovalent compounds are high. This is due to strong electrostatic forces between oppositely charged ions.</li> </ul> <p><b>Solubility</b></p> <ul style="list-style-type: none"> <li>◆ Ionic compounds (Electrovalent compounds) are generally soluble in polar solvents like water and insoluble in non-polar solvents like benzene, ether, alcohol, kerosene, petrol etc. Because water has high dielectric constant which weakens the forces.</li> </ul> <p><b>Conduction of Electricity</b></p> <ul style="list-style-type: none"> <li>◆ A solution of an ionic compound in water contains ions, which move to the opposite electrodes when electricity is passed through the solution. 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 ionic compounds conduct electricity in the molten state.</li> </ul>	3				

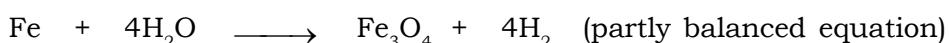
11.	i) $\text{CaCO}_3 \xrightarrow{\text{heat}} \text{CaO} + \text{CO}_2 (\text{g}) \uparrow$ ii) $\text{P}_4 + 10\text{Cl}_2 \longrightarrow 4\text{PCl}_5$ iii) $\text{CS}_2 + 3\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{SO}_2$	3															
12.	Electromagnet is a magnet formed by the magnetization of a piece of a magnetic material (such as soft iron) by inserting it into a solenoid.	1															
	<table border="1"> <thead> <tr> <th data-bbox="288 651 810 696">ELECTROMAGNET</th> <th data-bbox="810 651 1326 696">PERMANENT MAGNET</th> <td></td> </tr> </thead> <tbody> <tr> <td data-bbox="288 696 810 775">1. Temporary can be demagnetized.</td> <td data-bbox="810 696 1326 775">1. Permanent can't be demagnetized</td> <td data-bbox="1353 696 1377 741">½</td> </tr> <tr> <td data-bbox="288 775 810 853">2. Magnetic strength can be changed.</td> <td data-bbox="810 775 1326 853">2. Magnetic strength is fixed.</td> <td data-bbox="1353 775 1377 819">½</td> </tr> <tr> <td data-bbox="288 853 810 898">3. Polarity can be changed.</td> <td data-bbox="810 853 1326 898">3. Polarity is fixed.</td> <td data-bbox="1353 853 1377 898">½</td> </tr> <tr> <td data-bbox="288 898 810 987">4. Prepared from soft iron.</td> <td data-bbox="810 898 1326 987">4. Prepared from hard steel</td> <td data-bbox="1353 898 1377 943">½</td> </tr> </tbody> </table>	ELECTROMAGNET	PERMANENT MAGNET		1. Temporary can be demagnetized.	1. Permanent can't be demagnetized	½	2. Magnetic strength can be changed.	2. Magnetic strength is fixed.	½	3. Polarity can be changed.	3. Polarity is fixed.	½	4. Prepared from soft iron.	4. Prepared from hard steel	½	
ELECTROMAGNET	PERMANENT MAGNET																
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4. Prepared from soft iron.	4. Prepared from hard steel	½															
13.	i) "The process, due to which a changing magnetic field in a conductor induces a current in another conductor, is called electromagnetic induction". ii) Induced magnetic field will be in the form of concentric circles in the plane of paper. iii) No, because both of them would then be ineffective in controlling the amount of current flowing.	1 1 1															
14.	(i) Yes, Alpha particles being positively charged constitute a current in the direction of motion. (ii) No. The neutrons being electrically neutral constitute no current. Strength of the magnetic field falls as distance increases.	1 1 1															
15.	A vital function is that process in the body which is necessary for the survival of the organism. Respiration involves catabolism or oxidative break down of digested food to release energy in the form of ATP. This energy is required for functioning of brain, movement, reproduction and almost all the functions of the organism. Thus, respiration is a vital function of the body.	3															
16.	i) Since pituitary gland exercises control over other endocrine glands through secretions of its hormones, it is commonly called master endocrine gland. ii) In emergency situation when the person faces stress or danger, secretions of adrenal glands increase the rate of heart, rate of breathing as well as result in increase in blood pressure, basal	3															

	metabolic rate and sugar level in blood. Because of above roles in fight or flight reaction, the adrenals are known as the glands of emergency.													
17.	(a) Dendrites receive the information (b) Synapse (c) Neurotransmitters.	3												
18.	In nuclear electricity generators, the process used currently involves the fission of U-235 nuclei by bombarding them with thermal neutrons. Water is one of the coolants; graphite is one of the moderators.	1 1 1												
19.	Equivalent resistance of three resistance of $6 \Omega$ connected in parallel is given by $\frac{1}{R_p} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2} \text{ or } R_p = 2 \Omega$ Resistances of $3 \Omega$ and $2 \Omega$ are in series. $\therefore$ Net resistance = $3 + 2 = 5 \Omega$	3												
20.	<b>Step I</b> : List the number of atoms of different elements present in the unbalanced equation. $\text{Fe} + \text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$	5												
	<table border="1"> <thead> <tr> <th>Element</th> <th>Number of atoms in reactants (LHS)</th> <th>Number of atoms in products (RHS)</th> </tr> </thead> <tbody> <tr> <td>Fe</td> <td>1</td> <td>3</td> </tr> <tr> <td>H</td> <td>2</td> <td>2</td> </tr> <tr> <td>O</td> <td>1</td> <td>4</td> </tr> </tbody> </table>	Element	Number of atoms in reactants (LHS)	Number of atoms in products (RHS)	Fe	1	3	H	2	2	O	1	4	
Element	Number of atoms in reactants (LHS)	Number of atoms in products (RHS)												
Fe	1	3												
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$\Rightarrow$	<b>Step II</b> : Start balancing with the compound that contains the maximum number of atoms. It may be a reactant or a product. We select $\text{Fe}_3\text{O}_4$ and the element oxygen in it. There are four oxygen atoms on the RHS and only one on the LHS. To balance the oxygen atoms :													
	<table border="1"> <thead> <tr> <th>Atoms of oxygen</th> <th>In reactants</th> <th>In products</th> </tr> </thead> <tbody> <tr> <td>Initial</td> <td>1 (in <math>\text{H}_2\text{O}</math>)</td> <td>4 (in <math>\text{Fe}_3\text{O}_4</math>)</td> </tr> <tr> <td>To balance</td> <td><math>1 \times 4</math></td> <td>4</td> </tr> </tbody> </table>	Atoms of oxygen	In reactants	In products	Initial	1 (in $\text{H}_2\text{O}$ )	4 (in $\text{Fe}_3\text{O}_4$ )	To balance	$1 \times 4$	4				
Atoms of oxygen	In reactants	In products												
Initial	1 (in $\text{H}_2\text{O}$ )	4 (in $\text{Fe}_3\text{O}_4$ )												
To balance	$1 \times 4$	4												
	To equalise the number of atoms, we cannot alter the formulae of the compounds or elements involved in the reaction. For example, to balance oxygen atoms we can put coefficient '4' as $4\text{H}_2\text{O}$ and not $\text{H}_2\text{O}_4$ . Now the partly balanced equation becomes :													
	$\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + \text{H}_2 \text{ (partly balanced equation)}$													

⇒ **Step III** : Fe and H atoms are still not balanced. Let us balance hydrogen atoms in the partly balanced equation. To equalise the number of H atoms, make the number of molecules of hydrogen as four on the RHS.

Atoms of hydrogen	In reactants	In products
Initial	8(in 4 H <sub>2</sub> O)	2 (in H <sub>2</sub> )
To balance	8	2 × 4

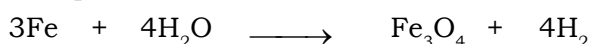
The equation would be



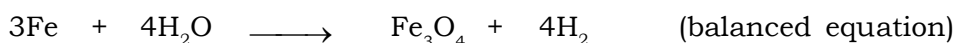
⇒ **Step IV** : Now balance Fe in the equation.

Atoms of iron	In reactants	In products
Initial	1 (in Fe)	3 (in Fe <sub>3</sub> O <sub>4</sub> )
To balance	1 × 3	3

To equalise Fe, we take three atoms of Fe on the LHS



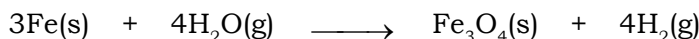
⇒ **Step V** : Finally to check the correctness of the balanced equation, we count atoms of each element on both sides of the equation



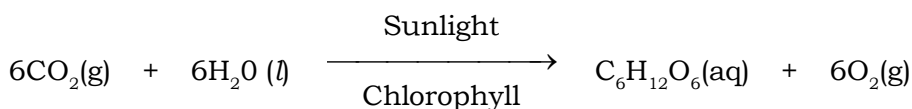
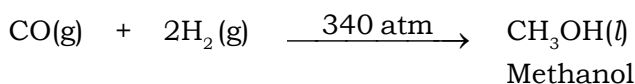
The numbers of atoms of elements on both sides of the equation are equal. This equation is now balanced. This method of balancing chemical equations is called hit-and-trial method as we make trials to balance the equation by using the smallest whole number coefficient.

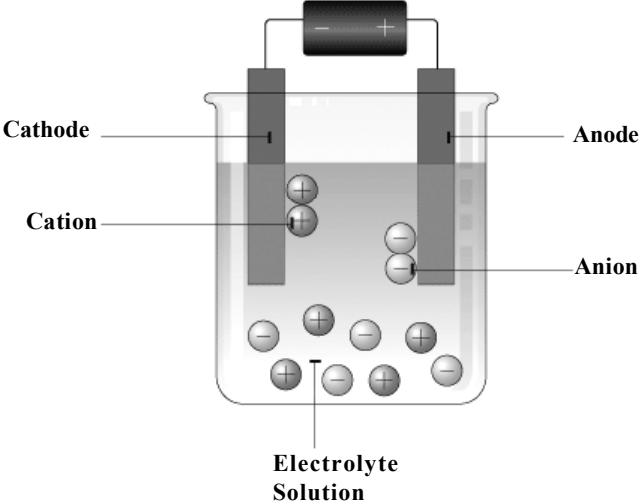
⇒ **Step VI** : Writing symbols of physical states : To make a chemical equation more informative, the physical states of the reactants and products are mentioned along with their chemical formulae. The gaseous, liquid, aqueous and solid states of reactants and products are represented by the notations (g), (l), (aq) and (s) respectively. The word aqueous (aq) is written if the reactant or product is present as a solution in water.

The above balanced equation becomes :



Sometimes the reaction conditions, such as temperature, pressure, catalyst, etc., for the reaction are indicated above and / or below the arrow in the equation. For example,



	<p style="text-align: center;"><b>OR</b></p> <p>20. Types of decomposition reactions:</p> <ol style="list-style-type: none"> <li>1. Thermal decomposition</li> <li>2. Electrical decomposition/ electrolysis</li> <li>3. Light decomposition/ photolytic decomposition</li> </ol> <p><b>Electrolysis of water:</b></p> <ol style="list-style-type: none"> <li>1. When electric current is passed through acidified water, it decomposes to give hydrogen gas and oxygen gas. This reaction can be represented as:  <math display="block">2\text{H}_2\text{O} (l) \longrightarrow 2\text{H}_2(g) + \text{O}_2(g)</math> <div style="display: flex; justify-content: space-around; width: 100%;"> <span>Water</span> <span>hydrogen</span> <span>Oxygen</span> </div> </li> </ol> <p>In this decomposition, a single compound splits up to form two simpler substances, hydrogen and oxygen. This decomposition reaction takes place by the action of electricity. It is called electrolysis of water. We can carry out the electrolysis of water as follows:</p> <div style="text-align: center;">  </div> <ol style="list-style-type: none"> <li>(i) Take a wide-mouthed glass bottle B (with bottom removed). Fix it on a stand in the inverted position as shown in figure.</li> <li>(ii) A rubber cork having two holes is fitted in the bottle. Two carbon rods (called carbon electrodes) are fixed in the two holes of the cork tightly (The 'carbon rods' are actually 'graphite rods').</li> <li>(iii) Fill the glass bottle two-thirds with water. Add a few drops of dilute sulphuric acid to water (to make water a good conductor of electricity).</li> <li>(iv) Two similar test-tubes filled with water are carefully inverted over the two carbon electrodes by keeping thumb over their mouth so that initially they remain completely filled with water.</li> <li>(v) Connect the outer ends of carbon rods to the two terminals (+ and -) of a 6 volt battery by wired having a switch in them (see figure). The left side carbon rod connected to the negative terminal of the battery is called cathode (negative electrode). The right side carbon rod connected to the positive terminal of the battery is called anode (positive electrode).</li> </ol>	<p><b>5</b></p>
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<p>(vi) Pass in electric current through water by turning on the switch and leave the apparatus undisturbed for some time.</p> <p>(vii) We will see the bubbles of gases being formed at both the carbon electrodes inside the test-tubes containing water (see figure). These gases are formed by the decomposition of water on passing electricity.</p> <p>(viii) The gases formed at the two electrodes go on collecting in the top parts of the inverted test-tubes (and the water level in these test-tubes falls gradually).</p> <p>(ix) The volume of gases collected in the two test-tubes is not the same. The volume of the gas collected on the negative electrode (left electrode) is double the volume of gas collected in the positive electrode (right electrode) (see figure).</p> <p>(x) Keep on passing electric current till both the test-tubes are completely filled with respective gases. Then remove the gas-filled test-tubes carefully and test them one by one by bringing a burning candle close to the mouth of each test-tube.</p> <p>(xi) When a burning candle is brought near the mouth of left test-tube, the gas in it burns rapidly making a 'pop sound' (or 'little explosion'). We know that hydrogen gas burns with a pop sound. So, the gas collected in the left test-tube over negative electrode (which had double volume or 2 volumes) is hydrogen.</p> <p>(xii) When the burning candle is taken near the mouth of the right side test-tube, the candle starts burning brightly. We know that oxygen gas makes things burn brightly. So, the gas collected in the right side test-tube over positive electrode (which had 1 volume) is oxygen.</p> <p>Since the electrolysis of water produces 2 volumes of hydrogen gas and 1 volume of oxygen gas, we can conclude that the ratio of hydrogen and oxygen elements in water is 2:1 by volume. In other words, electrolysis of water shows that water is a compound made up of 2 parts of hydrogen and 1 part of oxygen (by volume). So, the formula of water is <math>H_2O</math>.</p>		<b>5</b>
<p>21. Plants and Animals are sensitive to pH change</p> <ul style="list-style-type: none"> <li>- Our body works within the pH range of 7.0 to 7.8. Living organisms can survive only in a narrow range of pH change.</li> <li>- When rain water dissolves <math>SO_2</math> and <math>NO_2</math> gases present in the atmosphere, its pH is less than 5.6. This is called acid rain. When this acid rain flows into the rivers and seas, it lowers the pH of the water there, thus making survival of aquatic life difficult.</li> </ul> <p>⇒ pH of the soil in your backyard</p> <ul style="list-style-type: none"> <li>- Plants require a specific pH range for their healthy growth i.e between 6.0 to 7.5.</li> </ul> <p>⇒ pH in our Digestive system</p> <ul style="list-style-type: none"> <li>- Our stomach produces hydrochloric acid. It helps in the digestion of food</li> </ul>		

without harming the stomach. During indigestion the stomach produces too much acid and this causes pain and irritation. To get rid of this pain, people use bases called antacids. These antacids neutralise the excess acid. Magnesium hydroxide (Milk of magnesia), a mild base, is often used for this purpose.

⇒ pH change as the causes of Tooth Decay

- Tooth decay starts when the pH of the mouth is lower than 5.5. Tooth enamel, made up of calcium phosphate is the hardest substance in the body. It does not dissolve in water, but is corroded when the pH in the mouth is below 5.5. Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating.
- The best way to prevent this is to clean the mouth after eating food. Using toothpastes, which are generally basic, for cleaning the teeth can neutralise the excess acid and prevent tooth decay.

⇒ Self Defence by Animals and Plants Through Chemical Warfare

- Bee-sting leaves an acid (formic acid) which causes pain and irritation. Use of mild base like baking soda on the stung area gives relief. Stinging hair of nettle leaves inject methanoic acid causing burning pain.

⇒ Some naturally occurring acids

Natural source	Acid
Vinegar	Acetic acid
Orange	Citric acid
Tamarind	Tartaric acid
Tomato	Oxalic acid
Sour milk (Curd)	Lactic acid
Lemon	Citric acid
Ant sting	Methanoic acid
Nettle sting	Methanoic acid

OR

(a) i)

Nature	pH	Solution
(a) Neutral	7	D
(b) Strongly alkaline	11	C
(c) Strongly acidic	1	B
(d) Weakly acidic	4	A
(e) Weakly alkaline	9	E

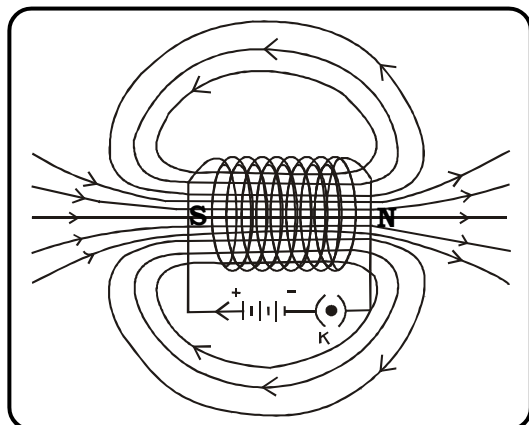
ii) Arrangement of the pH in increasing order of hydrogen – ion concentration are as follows :

$$11 < 9 < 7 < 4 < 1$$

(b) Basic solutions also have  $H^+$  ions in addition to  $OH^-$  ions. They are basic because in these solutions  $OH^-$  ion concentration is greater than  $H^+$  ion concentration.

5

22. (i)



(ii) The strength of an electromagnet is :

- (i) directly proportional to the current flowing through the coil.
- (ii) directly proportional to the number of turns in the coil.
- (iii) inversely proportional to the length of air gap between its poles.

**OR**

i) Magnetic field is the region around the magnet where the magnetic forces of attraction and repulsion exist.

1

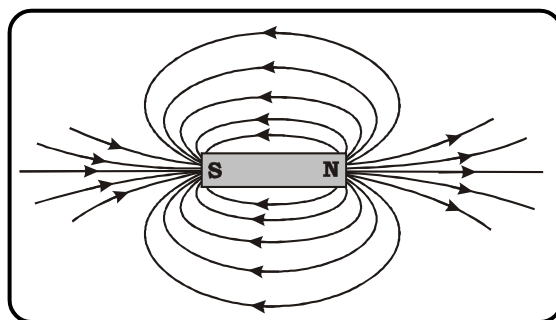
ii) The weak ionic currents flowing along the nerve cells produce magnetic field in the human body.

1

iii) Magnetic field lines are the lines drawn in a magnetic field along which a north pole would move. If two magnetic field lines intersect, it would mean that at the point of intersection, the north pole would point towards two directions, which is not possible. Hence, two magnetic field lines do not intersect each other.

3

iv)

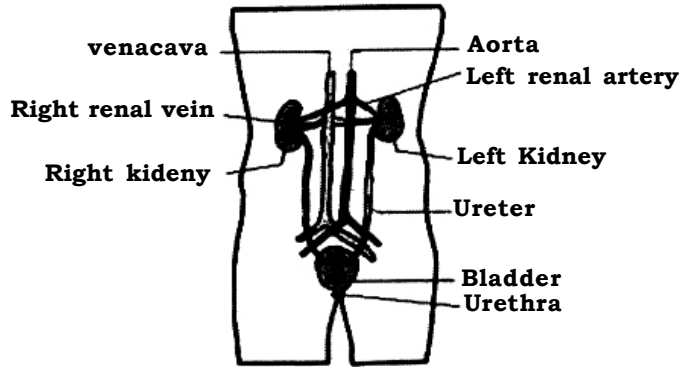


1



<p>23.</p>	<p>i) The process by which a changing magnetic field in a conductor induces a current in another conductor, is called electromagnetic induction.</p> <p>ii) The two ways to induce current on a coil are :</p> <p>(i) by moving the coil in a fixed magnetic field.</p> <p>(ii) by moving the magnet so that the magnetic field around the coil changes.</p> <p>iii) A fuse is a safety device having a thin wire made up of a material having low melting point. It melts and break the circuit if current exceeds a safe value. It works on the heating effect of electric current.</p>	<p>1</p> <p>2</p> <p>2</p>
<p><b>OR</b></p>		
<p>(a) A small aluminium rod suspended horizontally from a stand using two connecting wires. Place a strong horseshoe magnet in such a way that the rod lies between the two poles with the magnetic field directed upward. 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 (B to A). The rod is displaced towards left. When the direction of current flowing through the rod is reversed, the displacement of rod across towards right.</p>	<p>5</p>	
<p>(b) Flemings left hand rule. Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If the fore finger points in the direction of magnetic field and the middle finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor.</p> <p>(c) Perpendicular to the plane of the paper outwards.</p>		

24. (i) Urea, Uric acid and ammonia.  
 (ii) Nephridium in earthworm, Gills in fish, Kidney in human being  
 (iii)



Or

- (i) Pericardium  
 (ii) (a) Tricuspid valve (b) Bicuspid valve  
 (iii) (a) Capillaries (b) Veins.

**SECTION - B**

25. (d) Hg 1  
 26. (d) Zinc 1  
 27. (d)  $\text{Fe}^{2+}$  1  
 28. (c) double displacement reaction 1  
 29. (b)  $\text{BaSO}_4$  1  
 30. (a) a proton donor 1  
 31. (b) mostly ions 1  
 32. (a) 0.895A 1  
 33. (d) density 1  
 34. (c) Energy 1  
 35. (a) I only 1  
 36. (c) In the circuit (X) the resistors have been connected in parallel whereas these are connected in series in circuit. (Y) 1  
 37. (b) creates partial vacuum in the flask. 1  
 38. (d) Translocation 1  
 39. (c) Germinating 1  
 40. (b) dissolve chlorophyll 1  
 41. (a) Washing with water 1  
 42. (d) Rotten 1

