

CBSE Board
Class X Science
Term 1 Sample
Paper - 3

Time: 3 hrs

Total Marks: 90

General Instructions:

1. The question paper comprises of **two sections, A and B**. You are to attempt both the sections.
 2. There is no overall choice. However, internal choice has been provided in all the five questions of five marks category. Only one option in such question is to be attempted
 3. All the questions of **Section-A** and **Section-B** are to be attempted separately.
 4. Question numbers **1 to 3** in **Section - A** are **one mark** questions. These are to be answered in one word or one sentence.
 5. Question numbers **4 to 7** in **section - A** are **two marks** questions, to be answered in about **30 words each**.
 6. Question number **8 to 19** in **section-A** are **three marks** questions, to be answered in about **50 words**.
 7. Question number **20 to 24** in **section-A** are **five marks** questions, to be answered in about **70 words**.
 8. 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 select one most appropriate response out of the four provided to you.
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SECTION-A

Attempt all questions from this section.

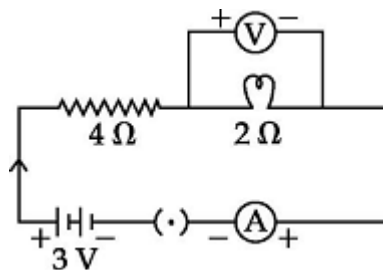
Q1. Why decomposition reactions are called the opposite of combination reactions?

Q2. What happens to the resistance of a conductor when its area of cross-section is increased?

Q3. What is tidal energy?

Q4. A solution of potassium chloride when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction?

Q5. Study the following electric circuit.



Find the reading of (i) the ammeter, (ii) the voltmeter

Q6. Explain briefly two methods of producing induced current.

Q7. What are the two vital functions of the human kidneys?

Q8. Explain why:

- Digestion of food is a decomposition reaction.
- All decomposition reactions are endothermic reactions.
- A popping sound is produced when a burning candle is brought near mouth of a test tube used in electrolysis of water.

Q9.

- What happens when a strip of lead metal is placed in a solution of copper chloride? Write the balanced chemical equation for the reaction along with the colour changes observed during the reaction.
- What are precipitation reactions? Give one example of precipitation reaction.

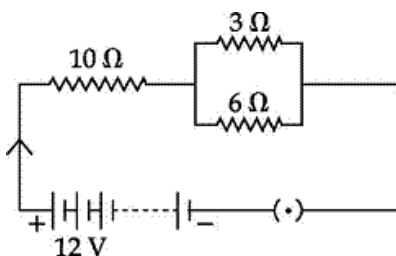
Q10. A solution of a substance 'X' is used for white washing.

- Name the substance 'X' and write its formula.
- Write the reaction of the substance 'X' named in (i) above with water.
- Write the balanced equation for the following chemical reaction:
Barium chloride + Aluminium sulphate \longrightarrow Barium sulphate + Aluminium chloride

Q11. Farmers are using a large number of pesticides and fertilizers in their fields to increase crop production and to enhance their profits. But by doing so they are causing damage to the soil as well as to the environment. Do you agree with this statement? Why should we avoid eating fruits and vegetables without washing them properly? What values do you get from this?

Q12. Describe the use of aluminium as reducing agent for reduction of metal oxides. Give the equations involved.

Q13. Consider the circuit shown in the diagram. Find the current in $3\ \Omega$ resistor.

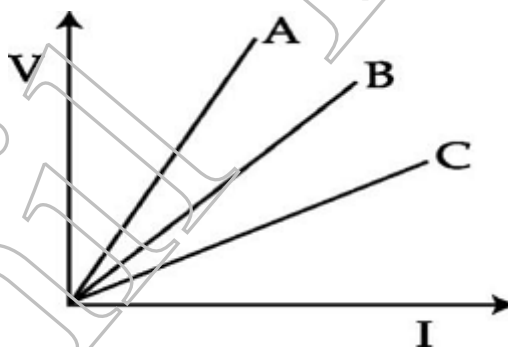


Q14.

- Charcoal is a better fuel than wood. Why?
- How does biogas plant help to reduce the problem of pollution?

Q15. A student performs an experiment with 4 cells and a resistance wire and an ammeter in series and observes that when the number of cells in the circuit is decreased, the value of current through the wire also decreases. Name the law that is involved in the experiment and write its mathematical form.

V-I graph for two resistors R_1 , R_2 and their series combination are shown in the figure below. Which graph represents the series combination of the other two? Give reason.

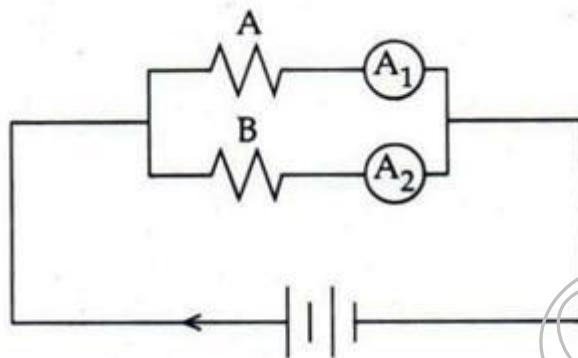


Q16.

- Mention the factors on which the direction of force experienced by a current carrying conductor placed in a magnetic field depend.
- Under what condition is the force experienced by a current carrying conductor placed in a magnetic field maximum?
- A proton beam is moving along the direction of a magnetic field. What force is acting on proton beam?

Q17. How are involuntary actions different from reflex actions?

Q18. In the circuit diagram shown, the two resistance wires A and B are of same length and same material, but A is thicker than B. Which ammeter A_1 or A_2 will indicate higher reading for current? Give reason.



Q19. List any three hazards of nuclear waste.

Q20. A sanitary worker uses a white chemical having strong smell of chlorine gas to disinfect the water tank.

- Identify the chemical compound.
- Write the chemical formula.
- Write chemical equation for preparing it.
- Write its any two uses.

Or

- Write an equation to show the reaction between Plaster of Paris and water.
- Name the substance which on treatment with chlorine yields bleaching powder.
- Name the sodium compound which is used for softening hard water.
- What will happen if a solution of sodium hydrogen carbonate is heated? Give the equation of the reaction involved.

Q21. Define corrosion. Name a metal which corrodes and one metal which does not.

Write any three methods of prevention of corrosion.

Or

Write balanced chemical equation for the reactions taking place when

- (a) Zinc carbonate is calcinated.
- (b) Zinc sulphide is roasted.
- (c) Zinc oxide is reduced to Zinc.
- (d) Cinnabar is heated in the air.
- (e) Manganese dioxide is heated with Aluminium Powder.

Q22. Briefly explain an activity to plot the magnetic field lines around a straight current carrying conductor. Sketch the field pattern for the same, specifying current and field directions. What happens to this field?

- (a) If the strength of the current is decreased?
- (b) If the direction of the current is reversed?

Or

Briefly explain an activity to plot the magnetic field lines around a bar magnet. Sketch the field pattern for the same specifying field directions.

A region 'A' has magnetic field lines relatively closer than another region 'B'. Which region has stronger field? Give reason to support your answer.

Q23.

(a) Draw diagram of respiratory system and label the following:

- (a) Part through which air is taken in.
- (b) Part which protects the lungs.
- (c) Part which carry the air into the lungs.

(b) What are alveoli? Mention their role in respiration.

(c) Differentiate between aerobic and anaerobic respiration.

Or

(a) Draw a sectional view of the human heart and label on it the following parts:

- (i) Aorta (ii) Pulmonary arteries
- (iii) Vena cava from upper body (iv) Left ventricle

(b) Why is double circulation of blood necessary in human beings?

Q24.

- (a) Mention any three important functions of fore brain.
- (b) What are the functions of spinal cord?

Or

(a) Draw the structure of a neuron and label the following on it:

Nucleus, Dendrite, cell body and Axon.

(b) Name the part of neuron.

- (i) Where information is acquired.
- (ii) Through which information travels as an electrical impulse.

SECTION-B

Q25. A student took solid quicklime in a china dish and added a small amount of water to it. He would hear:

- A. A pop sound
- B. A crackling sound
- C. A hissing sound
- D. No sound at all

Q26. A student adds a few drops of universal indicator to an aqueous solution of sodium hydroxide. He would observe that the colour of the solution changes from:

- A. Colourless to red
- B. Colourless to blue
- C. Red to blue
- D. Blue to red

Q27. A colourless sample was tested with a strip of pH paper. The colour of the strip changed to green. The sample should be:

- A. Tap water
- B. Distilled water
- C. Sodium hydroxide
- D. Lemon juice

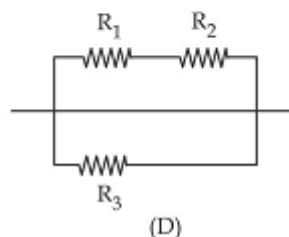
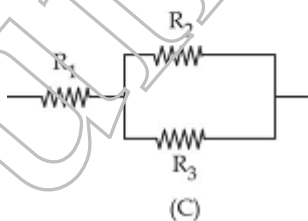
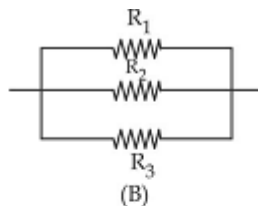
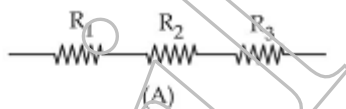
Q28. When blue litmus is added to a solution of acetic acid, it turns red. When excess of NaOH is added to the above solution, it will be observed that the mixture:

- A. Remains red
- B. Becomes colorless
- C. Turns blue
- D. Turns green

Q29. An iron nail was kept immersed in aluminum sulphate. After about an hour, it was observed that:

- A. The colourless solution changed to light green.
- B. The solution becomes warm.
- C. Grey metal is deposited on the iron nail.
- D. The solution remains colourless and no deposition is observed on iron nail.

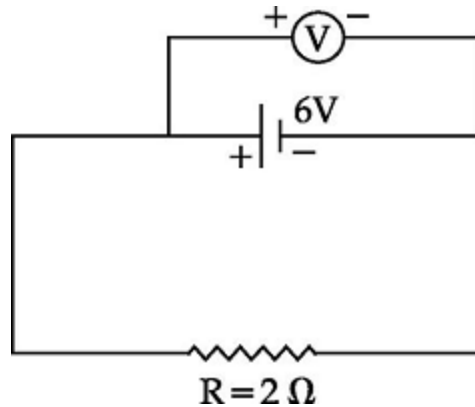
Q30. To determine the equivalent resistance of three resistors arranged in parallel four students connected the resistors as shown in figures A, B, C and D.



Which one is correct?

- A. A
- B. B
- C. C
- D. D

Q31. When a student connects a voltmeter across the terminals of a battery, it measures 6 V. If he connects a resistance of $2\ \Omega$ across the terminals of the battery as shown in the figure, then the current flowing through this resistance (R) must be:



- A. 2A
- B. 3A
- C. 4A
- D. 6A

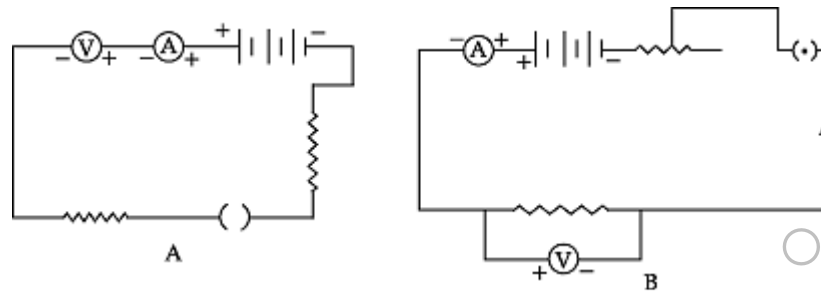
Q32. The range of a voltmeter is 0 to 2.0V. If it has 20 divisions between 0 mark and 0.5 V mark, the least count is:

- A. 0.020 V
- B. 0.025 V
- C. 0.050 V
- D. 0.250 V

Q33. Which one of the following precaution is NOT to be taken while conducting the experiment to determine the equivalent resistance of two resistors connected in series?

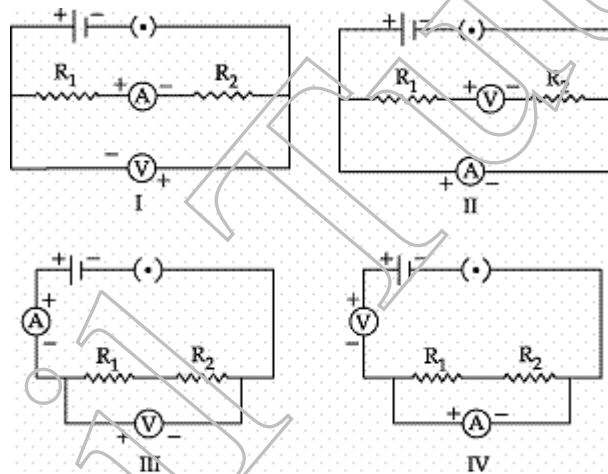
- A. Get the circuit diagram checked by your teacher before passing current.
- B. Connect +ve terminal of the ammeter to the +ve terminal of the battery.
- C. Wait at least for 30 seconds after closing the key.
- D. Take care that the battery is not short circuited.

Q34. Which of the following experimental set up is correct for verification of Ohm's law?



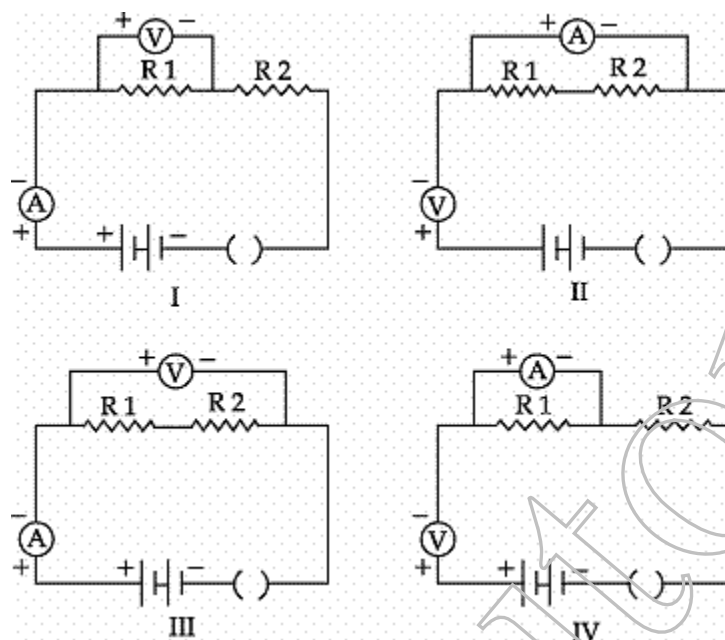
- A. A
- B. B
- C. Both A and B
- D. Neither A nor B

Q35. In the experiment to determine equivalent resistance of two resistors R_1 and R_2 in series, which of the circuit diagrams show the correct way of connecting the voltmeter?



- A. I and II
- B. II and III
- C. I and III
- D. II and IV

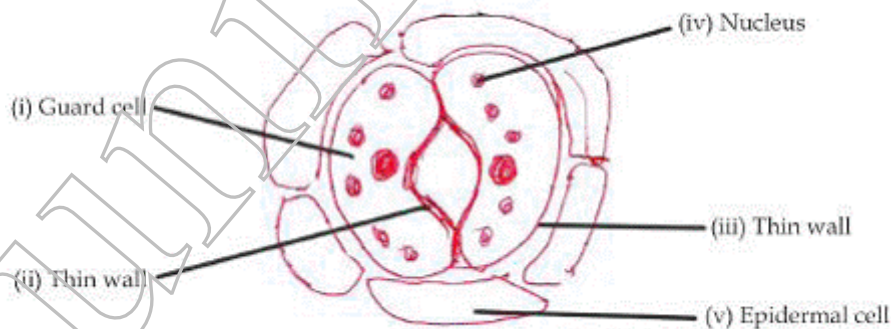
Q36. In the experiment on finding equivalent resistance of two resistors, connected in series, four students I, II, III and IV set up the circuit as shown below:



The correct connections have been made by student:

- A. I
- B. II
- C. III
- D. IV

Q37. In the following diagram of the stomatal apparatus, which parts are correctly labelled?



- A. (i) and (v)
- B. (ii) and (v)
- C. (iv) and (ii)
- D. (v) and (iv)

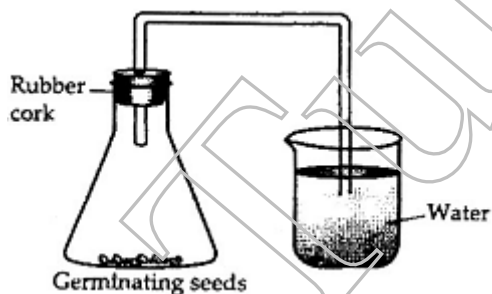
Q38. To determine that light is essential for photosynthesis, following are the steps, but not in sequence:

- (i) Pluck the leaf and do the starch test.
- (ii) Keep the selected plant in sunlight.
- (iii) Destarch the plant for 48 - 72 hours.
- (iv) Cover the leaf with black paper strip.

The correct sequence is:

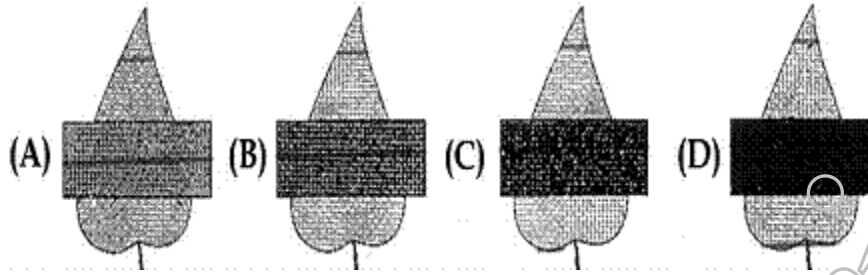
- A. (iii), (i), (ii), (iv)
- B. (iii), (ii), (iv), (i)
- C. (iii), (iv), (ii), (i)
- D. (i), (ii), (iv), (iii)

Q39. The following experiment was set up to show that a gas is given out during respiration. But there was no rise in the level of water. This was because:



- A. Germinating seeds have not been kept under water in the flask.
- B. Water is kept in the beaker instead of lime water.
- C. The cork on the flask is made of rubber.
- D. No substance is kept in the flask to absorb the gas given out by the seeds.

Q40. In an experiment on photosynthesis students were instructed to cover a portion of a leaf of a destarched potted plant with opaque paper as shown:



"A" covered one of the leaves with red strip, "B" with green, "C" with blue, "D" with black. When the starch test was done on the leaves after 4 hours, the result showed no starch in:

- A. The portion covered with red, green and blue strips
- B. The portion covered with green strips
- C. The portion covered with black and blue strips
- D. Any of the covered portions

Q41. Which of the following stain is used to see the stomata during temporary mount of leaf peel?

- A. Methylene blue
- B. Cotton blue
- C. Safranin
- D. None of these

Q42. A student sets up the apparatus for the experiment to show that CO_2 is released during respiration. After two hours he would observe:

- A. KOH turning milky.
- B. Water level rising in the bent tube in the beaker.
- C. Water level decreasing in the bent tube.
- D. No change in water level in the bent tube.

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Class X Science
Term 1 Sample
Paper - 3
Solution

Time: 3 hrs

Total Marks: 90

SECTION-A

Ans1. 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.

Ans2. On increasing the area of cross-section, resistance decreases. This is because resistance is inversely proportional to area.

Ans3. Energy possessed by the rising and falling water in tides is known as tidal energy.

Ans4. $\text{KCl(aq)} + \text{AgNO}_3(\text{aq}) \rightarrow \text{AgCl(s)} + \text{KNO}_3(\text{aq})$

It is a double displacement and precipitation reaction.

Ans5. Total resistance in the circuit = $4\ \Omega + 2\ \Omega = 6\ \Omega$

Current in the ammeter = $V/R = 3/6 = 0.5\ \text{A}$

Reading of the voltmeter = $2\ \Omega \times 0.5\ \text{A} = 1\ \text{V}$

Ans6.

1. By varying current in one coil, current can be induced in the neighbouring coil.
2. By moving a magnet towards or away from a coil, current can be induced in it.

Ans7.

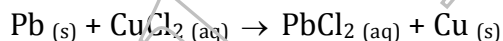
- (i) Human kidney performs the process of excretion by removing metabolic wastes from the blood.
- (ii) It performs the function of osmoregulation by maintaining normal levels of water and mineral ions in the body fluids.

Ans8.

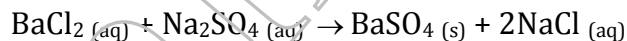
- (a) Digestion of food is a decomposition reaction. When we eat foods like wheat, rice or potatoes, then the starch present in them decomposes to give simple sugars like glucose in the body and the proteins decompose to form amino acids.
- (b) Energy in the form of heat, light or electricity is required for decomposition reactions to occur hence, these are endothermic.
- (c) A popping sound is produced when a burning candle is brought near the mouth of the test tube containing hydrogen gas since hydrogen burns in air with a popping sound.

Ans9.

- (a) When a strip of lead metal is placed in a solution of copper chloride, then lead chloride solution and copper metal are formed.
The green colour of copper chloride fades and the solution becomes colourless. a red brown coating of copper metal is deposited on the lead strip. Lead is more reactive than copper hence it is able to displace it from its solution.

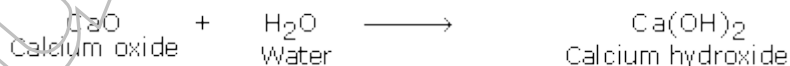


- (b) Any reaction in which an insoluble solid (precipitate) is formed that separates out from the solution is called a precipitation reaction.



Ans10.

- (i) The substance 'X' is calcium oxide. Its chemical formula is CaO.
- (ii) Calcium oxide reacts vigorously with water to form calcium hydroxide (slaked lime).



- (iii) $3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \longrightarrow 3\text{BaSO}_4 + 2\text{AlCl}_3$

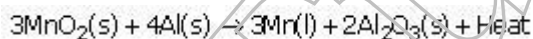
Ans11. Plants require a specific pH range for their healthy growth. By using a large no. of pesticides and fertilizers, pH of the soil changes which make it more acidic or basic. So, in the long run, the soil becomes infertile. This leads to soil erosion causing damage to the environment also. So, use of these pesticides and fertilizers should be restricted.

Fruits and vegetables should be first washed properly before eating to wash off any pesticides or fertilizers or harmful chemicals or dust from the surface of the vegetable or fruit.

Associated value: Knowledge of science, awareness.

Ans12. Aluminium is used as a reducing agent in the extraction of metals in those cases where the metal oxide is of a comparatively more reactive metal than zinc etc. which cannot be satisfactorily reduced by carbon. For example: the oxides of manganese and chromium metals are not satisfactorily reduced by carbon. So, these metals are extracted by the reduction of their oxides with aluminium powder. Aluminium powder reduces the metal oxide to metal and is itself oxidised to aluminium oxide.

Example: When manganese dioxide is heated with aluminium powder, then manganese metal is produced.



This reduction reaction of manganese dioxide with aluminium is a highly exothermic reaction.

Ans13.

$$\text{Current in the circuit} = \frac{12\text{V}}{10\Omega + \frac{6\Omega \times 3\Omega}{6\Omega + 3\Omega}} = \frac{12\text{V}}{10\Omega + 2\Omega} = 1\text{A}$$

Since the resistors in the parallel combination (3 ohm and 6 ohm) have values in the ratio 1:2,

1A current will be divided in the ratio of 2:1, i.e, $\frac{2}{3}\text{A}$, $\frac{1}{3}\text{A}$

$$\text{Current through } 3\Omega \text{ resistor} = \frac{2}{3}\text{A} = 0.67\text{A}$$

Ans14.

(a) Charcoal is a better fuel than wood because

- (i) It has higher heat generation efficiency than wood.
- (ii) It does not produce smoke when it is burnt, whereas wood produces a lot of smoke.

(b) Biogas plant helps to reduce the problem of pollution because large scale utilization of bio-waste and sewage materials provides safe and efficient method of waste disposal.

Ans15. Ohm's law

Mathematical form: $V/I = \text{Constant}$ or $V/I = R$

A represents the series combination of B and C because in series combination, the equivalent resistance becomes greater than either of the individual resistances, and since slope of A is greater than either of B and C, so resistance of A is greater than either of B and C.

Ans16.

(a) Factors on which the direction of force experienced by a current carrying conductor placed in a magnetic field depends are -

(i) the direction of current and (ii) the direction of magnetic field.

(b) The force acting on a current carrying conductor placed in a magnetic field is maximum when the direction of current is at right angles to the direction of the magnetic field.

(c) As proton beam is moving parallel to the direction of the magnetic field, no force acts on it.

Ans17. Involuntary actions are the actions which cannot be controlled by us if we want to do so. There is no external stimulus involved. The action takes place on its own like digestion, heartbeat, etc.

Reflex action is a kind of involuntary action controlled by and takes due to external stimulus. Its respond to the stimulus is quick. Example - sneezing, blinking of eyes, etc.

Ans18. Ammeter, A₁ will show higher reading.

Because, as wire A is thicker than B, A has lesser resistance. So higher current will be drawn by A from the battery and hence ammeter A₁ will show higher reading.

Ans19. Most of the nuclear wastes are radioactive and emit radiations which are dangerous.

- (i) Human body can tolerate the absorption of radiations up to certain level only. Beyond the tolerance level, it can cause irreparable damage to the cells and nuclei of the cells.
- (ii) It may cause cancer or death of human beings.
- (iii) Radiation may cause change in DNA or genes that may give deformation of organs in future generation.

Ans20.

(a) Bleaching Powder

(b) CaOCl₂

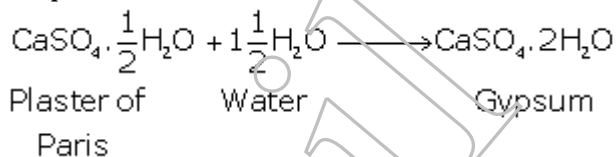
(c) $\text{Ca(OH)}_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$

(d) Bleaching powder is used:

- (i) As an oxidising agent in many chemical industries; and
- (ii) For disinfecting drinking water to make it free of germs.

Or

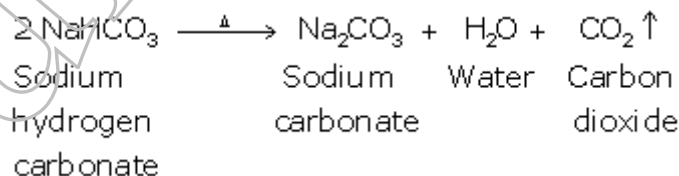
(a) The chemical equation for the reaction of Plaster of Paris and water can be represented as:



(b) Calcium hydroxide [Ca(OH)₂], on treatment with chlorine, yields bleaching powder.

(c) Washing soda (Na₂CO₃·10H₂O) is used for softening hard water.

(d) When a solution of sodium hydrogen carbonate is heated, sodium carbonate and water are formed with the evolution of carbon dioxide gas.



Ans21. Corrosion: Process of slowly eating up of metals due to action of atmospheric gases.

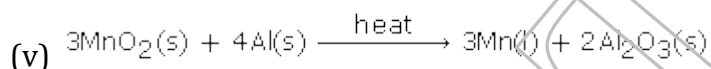
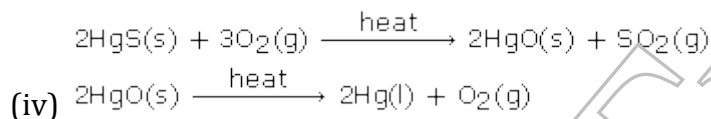
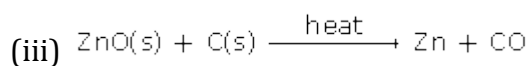
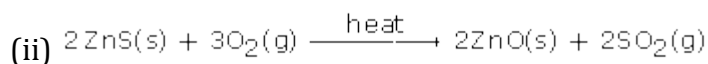
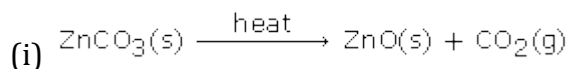
Metal that does not corrode → Gold

Metal which gets corroded → Iron

Prevention:

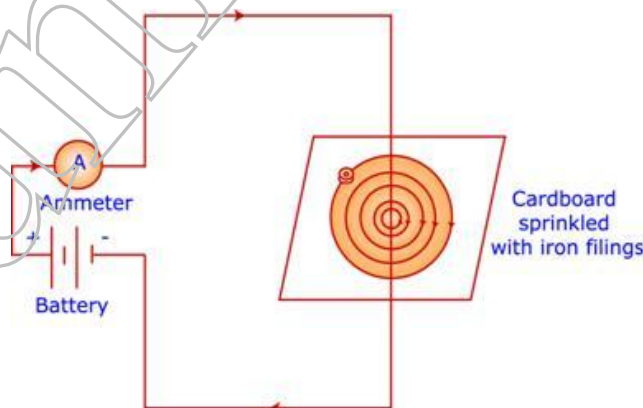
- (i) By painting
- (ii) By greasing or oiling
- (iii) Galvinization

Or



Ans22. Brief explanation of activity:

Connect the circuit as shown in the figure below. Switch on the battery so that the current begins to flow. Sprinkle some fine iron filings around the current carrying wire. Tap the surface gently. The iron filings get arranged in concentric circles which denote the shape of magnetic field lines around the straight current carrying conductor (i.e. the wire).

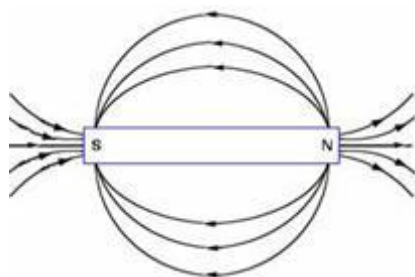


When current is decreased, field also gets decreased.

When the direction of current is reversed, direction of field also gets reversed.

Or

A magnet is placed on a sheet of paper. A compass needle is placed near the North Pole. The position of its two ends is marked with the help of a sharp pencil. Now the compass is moved in such a way that its south end occupies position occupied by north end previously. Again the two ends are marked with sharp pencil. In this way, process goes on step by step till the south pole of the magnet is reached. Now all points are joined to get a smooth curve which represents a field line. In this way many field lines can be drawn

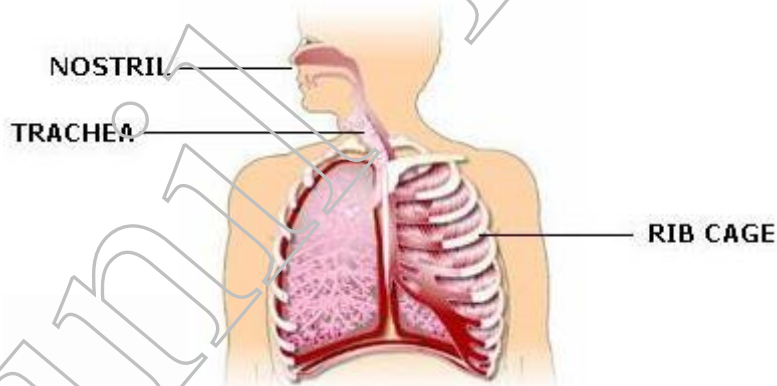


Region A has stronger magnetic field because the strength of the field is proportional to the relative closeness of field lines.

Ans23.

(a) Diagram of respiratory system:

- (i) Part through which air is taken in - Nostrils
- (ii) Part which protects the lungs - Rib cage
- (iii) Part which carry the air into the lungs - Trachea



(b) Within the lungs, the passage divides into smaller and smaller tubes which finally terminate in balloon - like structures which are called alveoli. The walls of the alveoli contain an extensive network of blood vessels.

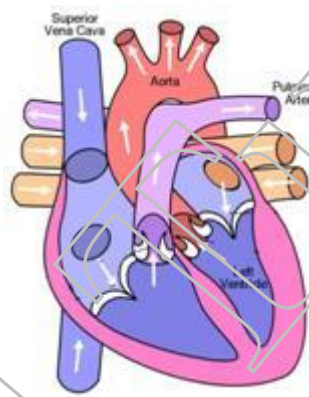
Role of alveoli in respiration - It provides a surface where the exchange of gases takes place.

(c)

Aerobic respiration	Anaerobic respiration
It is a type of respiration which takes place in the presence of oxygen.	It is a type of respiration which takes place in the absence of oxygen.
Glucose + Oxygen \rightarrow Energy + Carbon dioxide + Water.	Glucose \rightarrow Energy (ATP) + Ethanol + Carbon dioxide (CO ₂).

Or

(a)



(b) In double circulation there is complete segregation of oxygenated and deoxygenated blood. Because of this the blood passes twice through the heart in one cycle of circulation.

Ans24.

(a) The functions of fore brain are:

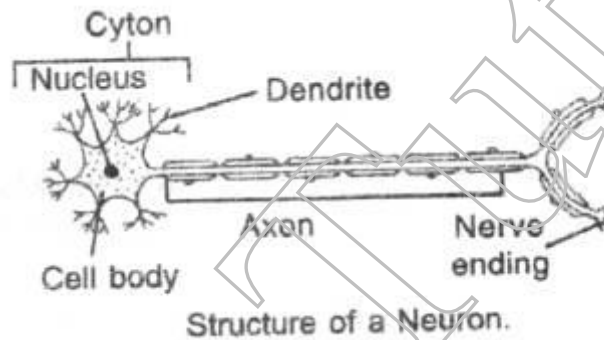
- (i) It has sensory area where information is received from sense organs.
- (ii) It has motor area where impulses are sent to muscles or effector organs.
- (iii) It has centres for visual reception, touch, smell, temperature and muscular activities.

(b) The functions of spinal cord are-

- (i) The spinal cord transmits sensory and motor impulses from brain to body parts and vice versa respectively.
- (ii) Reflex actions in our body are induced due to the spinal cord.

Or

(a)



(b)

- (i) Dendrite
- (ii) Axon

SECTION-B

Ans25. A hissing sound is produced since the reaction is highly exothermic.

Ans26. The colour of the solution changes from colourless to blue because of basic nature of sodium hydroxide.

Ans27. Distilled water since tap water gives a bluish colour to the pH strip.

Ans28. The mixture turns blue due to the basic nature of sodium hydroxide.

Ans29. The solution remains colourless and no deposition is observed on iron nail since iron cannot displace aluminium from its compound.

Ans30. In fig. B, the three resistors are connected in parallel.

Ans31. $I = V/R = 6/2 = 3A$

Ans32. $0.5/20 = 0.025 V$

Ans33. Resistance can be measured just immediately after closing the key.

Ans34. Voltmeter should be connected in parallel and ammeter in series.

Ans35. Voltmeter should be connected in parallel to the two resistances.

Ans36. Voltmeter should be connected in parallel across the combination of two resistors as given in III and ammeter should be connected in series with the two resistances.

Ans37. (i) and (v). As (ii) is thick wall not thin and (iv) is chloroplast not nucleus.

Ans38. (iii), (iv), (ii), (i)

Ans39. No substance is kept in the flask to absorb the gas given out by the seeds as there must be KOH to absorb the gas.

Ans40. Any of the covered portions. As all the covered leaves does not synthesize starch in the absence of light.

Ans41. Safranin

Ans42. Water level rising in the bent tube in the beaker. As low pressure is created in flask, germinating seeds use the O_2 present in the conical flask and give out CO_2 which is absorbed by KOH.