

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-13**

**Time : 3 Hours**

**Maximum Marks : 80**

**General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

## Section A

1. What is meant by renewable source of energy? [1]

**Ans :**

The source of energy which can be used again and again over a long period of time is called a renewable source of energy.

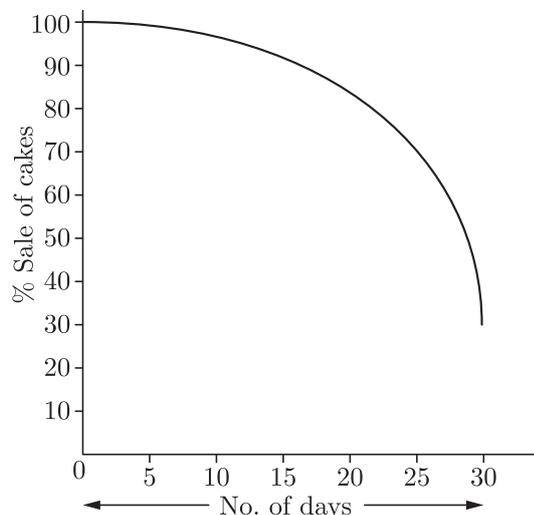
2. Which fossil fuel is generally referred to as clean fuel and why? [1]

**Ans :**

Natural gas, because on burning, it produces lesser pollutants and almost no ash particles.

3. Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.

To make a bread dough, a baker mixes flour, sugar and baking powder (mixture of baking soda and tartaric acid). After mixing all the ingredients, the dough is placed in a container for a few hours (in an oven). On heating, the mixture releases carbon dioxide gas leaving bubbles behind. This increases the size of the bread and makes it soft and spongy. Tartaric acid helps in removing bitter taste.



- 3.1 Why does the bread dough rise? [1]

**Ans :** On heating, baking soda (Sodium hydrogen-carbonate) decomposes to give CO<sub>2</sub> gas which

makes the bread dough rise.

- 3.2 'Yeast can be used in place of baking powder for making bread dough'. What is yeast? [1]

**Ans :** Yeast is a single-celled fungi.

- 3.3 What would you use to measure pH of baking powder? [1]

**Ans :** Universal indicator solution.

- 3.4 Based on the graph represented alongside, answer the following questions:

A bakery shop started using baking soda instead of baking powder for baking cakes. What could be the reason for the decrease in the sale of cakes? [1]

**Ans :** Baking soda (sodium hydrogen-carbonate) makes the cakes bitter in taste. This could be the reason for the decrease in sales.

4. Question numbers 4.1-4.4 are based on the two tables given below and the related studied concepts. Analyse the tables related to blood pressure of a patient and answer the questions that follow.

**Table A: Blood Pressure Chart**

Remarks	Systolic (mm of Hg)	Diastolic (mm of Hg)
Doctor's advice required	200-400	100 or higher
Good	100-140	80-89
Excellent	120	80

**Table B: Blood Pressure report of a Patient**

Checking Time	Systolic (mm of Hg)	Diastolic (mm of Hg)
Blood pressure for a week	130-150	100-120

- 4.1 Refer Table B that shows the blood pressure report of a patient. Which disease can be diagnosed from the given data? [1]

**Ans :** The blood pressure value of the patient is approx. 150-120 mm of Hg, which is higher than the normal blood pressure value, hence the person may be suffering from hypertension.

4.2 What is meant by systolic pressure? [1]

**Ans :** The pressure of blood inside the artery during ventricular systole (contraction) is called systolic pressure.

4.3 Refer Table A and find out the normal blood pressure value. [1]

- (a) 140-89 mm of Hg
- (b) 140-100 mm of Hg
- (c) 120-80 mm of Hg
- (d) 160-120 mm of Hg

**Ans :** (c) 120-80 mm of Hg

4.4 Which part of the brain controls blood pressure? [1]

- (a) Medulla
- (b) Cerebellum
- (c) Spinal cord
- (d) Cerebrum

**Ans :** (a) Medulla controls involuntary actions such as blood pressure.

or

Which instrument is used to measure blood pressure?

- (a) Sphygmomanometer
- (b) Hemotocrit
- (c) Stethoscope
- (d) Barometer

**Ans :** (a) Sphygmomanometer.

5. You are given four transparent liquids-water, mustard oil, kerosene and glycerine. A ray of light incident obliquely at the same angle in all the four media would bend the most in [1]

- (a) water
- (b) mustard oil
- (c) kerosene
- (d) glycerine

**Ans :** (d) glycerine

6. Which of the following pairs of phenomena is based on the scattering of light? [1]

- (a) Twinkling of star and blue colour of the sky.
- (b) Reddening of the Sun at sunrise and advanced sunrise.
- (c) Delayed sunset and reddening of the Sun at sunset.
- (d) Blue colour of the sky and colour of water in the deep sea.

**Ans :** (d) Blue colour of the sky and colour of water in the deep sea.

or

An object is kept in between two parallel plane mirrors facing each other. The number of images formed by this combination is [1]

- (a) 2
- (b) 4
- (c) 16
- (d) infinite

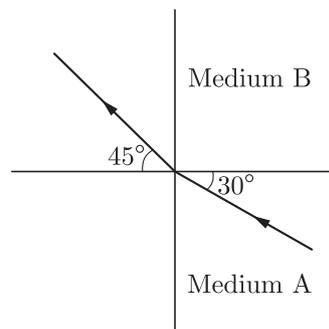
**Ans :** (d) infinite

7. A mixture of copper and zinc was dropped in a flask containing dil. HCl. Hydrogen gas was evolved immediately. This happened because of the reaction of [1]

- (a) copper with dil. HCl.
- (b) zinc with dil. HCl.
- (c) both copper and zinc with dil. HCl.
- (d) copper with dil. HCl in the presence of zinc as a catalyst.

**Ans :** (b) zinc with dil. HCl.

8. A ray of light, as shown in the figure, travels from medium A to medium B. The refractive index of medium B relative to medium A is [1]



- (a)  $\sqrt{2}$
- (b)  $\frac{1}{\sqrt{2}}$
- (c)  $\frac{\sqrt{2}}{\sqrt{3}}$
- (d)  $\frac{\sqrt{3}}{\sqrt{2}}$

**Ans :** (d)  $\frac{\sqrt{3}}{\sqrt{2}}$

9. Which the following alloys contains non-metal as one of its constituents? [1]

- (a) Amalgam
- (b) Solder
- (c) Steel
- (d) Brass

**Ans :** (c) Steel

or

Which of the following is a characteristic of metals?

- (a) They have one to three valence electrons
- (b) They have 4 to 8 valence electrons
- (c) They are brittle
- (d) They are capable to form anions easily

**Ans :** (a) They have one to three valence electrons

10. If the central portion of a convex lens is painted black, the image formed by the lens will be [1]

- (a) complete but with less brightness
- (b) complete with no effect on brightness
- (c) without central portion
- (d) blurred

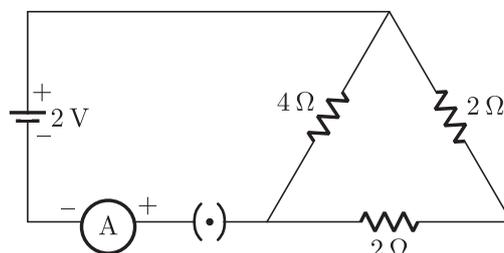
**Ans :** (a) complete but with less brightness

11. In general, the elements of group eighteen are non-reactive because they have [1]

- (a) a large number of neutrons.
- (b) more neutrons than protons in their nuclei.
- (c) outermost shells completely filled with electrons.
- (d) eighteen electrons in their valence shells.

**Ans :** (c) outermost shells completely filled with electrons.

12. In the adjoining circuit, the reading of the ammeter is [1]



- (a) 0.25 A (b) 0.5 A  
(c) 1.0 A (d) 2.0 A

Ans : (c) 1.0 A

For question numbers 13 and 14, two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- (a) Both A and R are true and R is correct explanation of the assertion.  
(b) Both A and R are true but R is not the correct explanation of the assertion.  
(c) A is true but R is false.  
(d) A is false but R is true.

13. **Assertion :** The energy of a charged particle moving at right angles to a uniform magnetic field does not change.

**Reason :** No work is done by the magnetic field on the charged particle. [1]

Ans : (a) Both A and R are true and R is correct explanation of the assertion.

14. **Assertion :** The limitation of using solar energy is overcome by using solar cells.

**Reason :** Solar cells directly convert solar energy into chemical energy which can be further converted into electrical energy/electricity. [1]

Ans : (c) A is true but R is false.

## Section B

15. Find out the oxidising agent (oxidant) in the following chemical reactions: [3]

- (a)  $\text{Pb}_3\text{O}_4 + 8\text{HCl} \longrightarrow 3\text{PbCl}_2 + \text{Cl}_2 + 4\text{H}_2\text{O}$   
(b)  $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$   
(c)  $\text{CuSO}_4 + \text{Zn} \longrightarrow \text{Cu} + \text{ZnSO}_4$   
(d)  $\text{V}_2\text{O}_5 + 5\text{Ca} \longrightarrow 2\text{V} + 5\text{CaO}$   
(e)  $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$   
(f)  $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$

Ans :

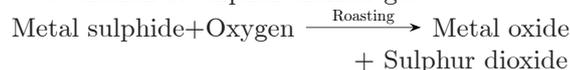
- (a)  $\text{Pb}_3\text{O}_4$  (b)  $\text{O}_2$   
(c)  $\text{CuSO}_4$  (d)  $\text{V}_2\text{O}_5$   
(e)  $\text{H}_2\text{O}$  (f)  $\text{CuO}$

16. An ore on treatment with dilute hydrochloric acid gives the rotten egg smell. What type of ore is this? How can the metal be obtained from its concentrated ore? [3]

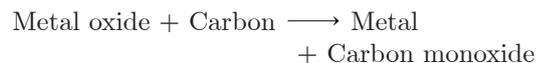
Ans :

- The ore, on treatment with dilute hydrochloric acid, gives the smell of a rotten egg, so the gas evolved is hydrogen sulphide ( $\text{H}_2\text{S}$ ). Hence it is a sulphide ore.
- The metal is obtained from its concentrated ore by the following metallurgical operations:
  - Roasting:** The process of heating of an ore in the presence of air. The metal sulphide is converted to metal oxide along with the

evolution of sulphur dioxide gas.



- (b) **Reduction with carbon:** On heating the metal oxide with carbon, it reduces to free metal with the evolution of carbon monoxide.



or

A boy treated a lustrous, divalent element M with sodium hydroxide. He observed the formation of bubbles in a reaction mixture. He made the same observations when this element was treated with hydrochloric acid. Suggest how he can identify the produced gas.

Write chemical equations for both the reactions. [3]

Ans :

- The gas produced in both the cases is hydrogen which can be easily identified by bringing a burning splinter near the mouth of the vessel in which the reaction occurs. The gas burns with a pop sound.
- $\text{M} + 2\text{NaOH} \longrightarrow \text{Na}_2\text{MO}_2 + \text{H}_2$   
(The element M is a metal.)  
 $\text{M} + 2\text{HCl} \longrightarrow \text{MCl}_2 + \text{H}_2$

17. List three limitations of Newlands' Law of Octaves? [3]

Ans :

- It did not extend beyond calcium and could not include all the known elements.
- It assumed that only 56 elements existed in nature and no more elements would be discovered in the future. Later, several elements were discovered with properties that could not fit into the Law of Octaves.
- Unlike elements were adjusted under the same slot. For example, the adjustment of hydrogen along with fluorine and chlorine on the basis of their chemical properties was not justified.

18. What are the differences between the transport of materials in xylem and phloem? [3]

Ans :

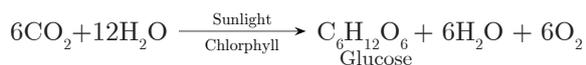
	Transport of material by xylem	Transport of material by phloem
(i)	Xylem transports water and minerals from roots to leaves.	Phloem transports food from leaves to root and other parts.
(ii)	Transpiration pull exerts a suction force for the smooth transport.	For translocation, osmotic pressure and expenditure of ATP energy play a major role.
(iii)	This is unidirectional, i.e., there is upward conduction of water and minerals.	This is bidirectional, i.e., translocation of food occurs both in the upward and downward direction according to the need of the plant.

19. Explain the mechanism of photosynthesis. [3]

Ans :

Photosynthesis occurs in following steps:

- (a) Necessary inputs required for photosynthesis are sunlight, chloroplast, carbon dioxide and water. Chloroplast responds to sunlight by releasing chlorophyll.
- (b) Energy from the Sun is converted/transformed into chemical energy called ATP. Sunlight also splits water molecules into hydrogen and oxygen. This oxygen escapes into the atmosphere.
- (c) Hydrogen uses the chemical energy to reduce carbon dioxide to glucose. Thus, carbohydrates are formed. The process of photosynthesis is given by the following reaction:



20. Is it possible that a trait is inherited but may not be expressed? Give a suitable example to justify this statement. [3]

Ans :

1. Yes, it is possible.
2. When a pure tall pea plant is crossed with a pure dwarf pea plant, only tall pea plants were obtained in F<sub>1</sub> generation. On selfing F<sub>1</sub> plant, both tall and dwarf plants were obtained in the F<sub>2</sub> generation in 3 : 1 ratio respectively.
3. Reappearance of the dwarf character in F<sub>2</sub> generation shows that it was inherited but not expressed in F<sub>1</sub> generation of tall plants.

or

Describe any three methods of tracing evolutionary relationship among organisms. [3]

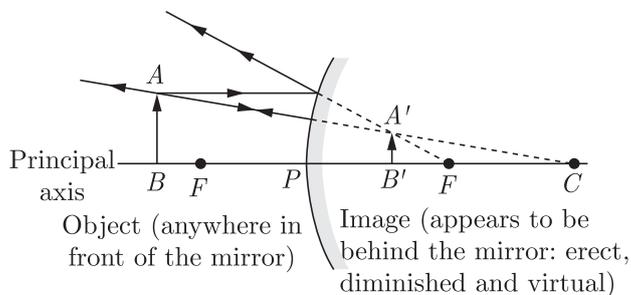
Ans :

- (a) **Homologous organs:** Organs which are formed on the same fundamental structural plan but differ in their shapes and functions are termed as homologous organs, e.g., a human arm and wings of a bird. Such a homologous characteristic helps to identify an evolutionary relationship between seemingly similar organisms.
- (b) **Analogous organs:** Organs with different origin and structure but performing similar function are called analogous organs, e.g., wing of a bird and wing of insects.
- (c) **Fossils:** The remains or impressions of dead and decayed plants and animals preserved in the layers of rocks are called fossils. These fossils are a direct evidence of species that no longer exist and are helpful in seeing how the present organisms have evolved from them, e.g., fossils of horse.

21. If the image formed by a mirror for all positions of an object placed in front of it is always erect and diminished, what kind of mirror is it? Draw a ray diagram to justify your answer. Where and why do we usually use this kind of mirror? [3]

Ans :

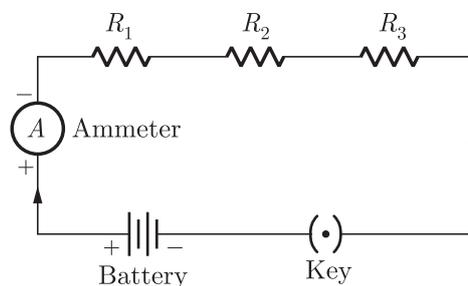
1. Convex mirror (Diverging mirror)
2. **Ray Diagram:**



3. **Uses of convex mirrors:** As rear view mirror in vehicles and also in malls, hotels and airports for security reasons because these mirrors always form an erect image and give a wider field of view.

22. How will you infer with the help of an experiment that the same current flows through every part of the circuit containing three resistances in series connected to a battery? [3]

Ans :

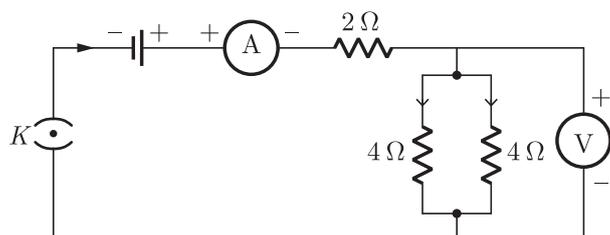


- (a) Take three resistors R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> of different values and join them end to end (i.e. in series). Connect them with a battery, an ammeter and a plug key, as shown.
- (b) Plug the key and note the ammeter reading.
- (c) Change the position of the ammeter to any place in between the resistors. Note the reading each time.
- (d) It is noticed that there is no change in the value of current through the ammeter irrespective of its position in the circuit, which shows that same current flows through each component in a series circuit.

23. Draw a diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of 2Ω in series with a combination of two resistors (4Ω each) in parallel and a voltmeter across the parallel combination. Will the potential difference across the 2Ω resistor be the same as that across the parallel combination of 4Ω resistors? Give reason. [3]

Ans :

Circuit Diagram



Yes, the potential difference across the 2Ω resistor will be the same as across the parallel combination of two resistors of 4Ω each. This is because the 2Ω

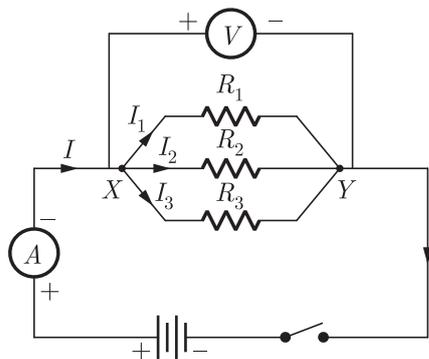
resistor and the parallel combination of two  $4\ \Omega$  resistors (whose equivalent resistance is also  $2\ \Omega$ ) are connected in series.

or

Three resistors  $R_1$ ,  $R_2$  and  $R_3$  are connected in parallel and the combination is connected to a battery, an ammeter, a voltmeter and a key. Draw the circuit diagram. Obtain an expression for the effective resistance of the combination of resistors in parallel. [3]

Ans :

Figure shows a combination of three resistors  $R_1$ ,  $R_2$  and  $R_3$  in parallel.



In parallel combination, the potential difference across the three resistors remains the same but the current through them differs. The total current of the circuit is the sum of current through all the resistors,

i.e.

$$I = I_1 + I_2 + I_3 = \frac{V}{R}$$

$$I_1 = \frac{V}{R_1}, \quad I_2 = \frac{V}{R_2}, \quad I_3 = \frac{V}{R_3}$$

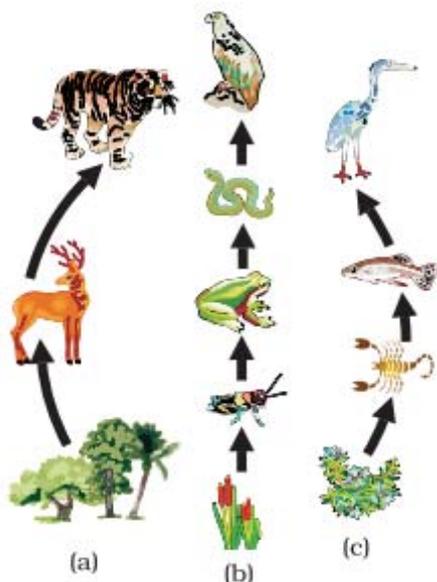
∴

$$\frac{V}{R} = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$$

$$\frac{V}{R} = V \left[ \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right]$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

24. Out of the given food chains (a), (a) and (c), which one has the minimum number of trophic levels? If in each food chain, the same amount of energy is available to the plants, in which case will the organism at top of the food chain get minimum energy for survival? [3]



Ans :

- Food chain (a) has the minimum number of trophic levels (three trophic levels).
- The longer the food chains, the lesser is the amount of energy at the top of the food chain. So, in the food chain (b) which has five trophic levels, the energy available to eagles (organisms at the top) will be minimum.

## Section C

25. (a) Write the balanced chemical equations for the preparation of following salts:
- A soluble sulphate (by the action of an acid on a metal).
  - A soluble sulphate (by the action of an acid on an insoluble metal oxide).
  - An insoluble sulphate (by the action of an acid on another salt).
- (b) Sodium reacts with oxygen to produce sodium oxide which dissolves in water to form sodium hydroxide. On adding hydrochloric acid to the base solution, salt and water are produced. Write balanced chemical equations to represent all the chemical reactions stated in the question. [5]

Ans :

- (a) (i) A soluble sulphate (zinc sulphate) is formed by the action of an acid on a metal, e.g.
- $$\text{Zn(s)} + \text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g})$$
- (ii) A soluble sulphate formed by the action of an acid on an insoluble metal oxide, e.g.
- $$\text{CuO(s)} + \text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{CuSO}_4(\text{aq}) + \text{H}_2\text{O(l)}$$
- (iii) An insoluble salt by the action of acid on another salt, e.g.
- $$2\text{BaCl}_2(\text{aq}) + 2\text{H}_2\text{SO}_4(\text{aq}) \longrightarrow 2\text{BaSO}_4\downarrow + 4\text{HCl}(\text{aq})$$
- Insoluble salt
- (b)  $4\text{Na(s)} + \text{O}_2(\text{g}) \longrightarrow 2\text{Na}_2\text{O}(\text{aq})$   
 $\text{Na}_2\text{O}(\text{aq}) + \text{H}_2\text{O}(\text{aq}) \longrightarrow 2\text{NaOH}(\text{aq})$   
 $\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \longrightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{aq})$

or

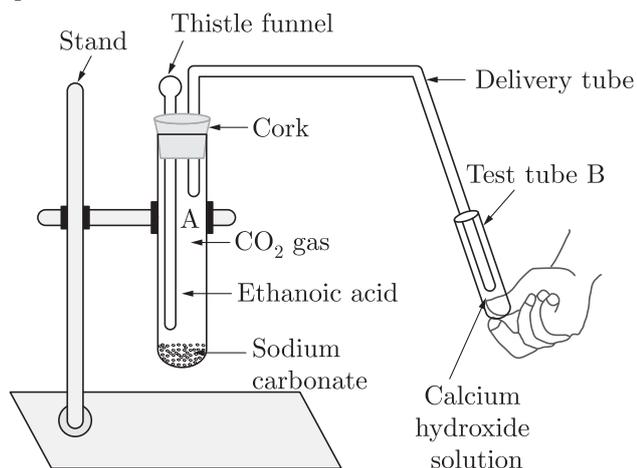
What happens when a piece of

- zinc metal is added to copper sulphate solution?
  - aluminium metal is added to dilute hydrochloric acid?
  - silver metal is added to copper sulphate solution?
- Also, write the balanced chemical equations if a reaction occurs. [5]

Ans :

- (a) Zinc being more reactive than copper, displaces copper from its blue coloured solution and a colourless solution of zinc sulphate is obtained.
- $$\text{Zn(s)} + \text{CuSO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu(s)}$$
- (b) Aluminium being more reactive than hydrogen displaces hydrogen from dilute HCl and hydrogen gas is evolved.
- $$2\text{Al(s)} + 6\text{HCl(l)} \longrightarrow 2\text{AlCl}_3(\text{aq}) + 3\text{H}_2(\text{g})$$
- (c) Silver metal being less reactive than copper cannot displace copper from its aqueous solution. Hence no reaction takes place.
- $$\text{Ag(s)} + \text{CuSO}_4(\text{aq}) \longrightarrow \text{No reaction}$$

26. Look at the given figure and answer the following questions.



- What change would you observe in the calcium hydroxide solution taken in tube B?
- Write the reaction involved in test tubes A and B respectively.
- If ethanol is taken instead of ethanoic acid, would you expect the same change?
- How is a solution of lime water prepared in the laboratory? [5]

Ans :

- Calcium hydroxide solution (lime water) will turn milky.
- Reaction in test-tube A:  

$$2\text{CH}_3\text{COOH} + \text{Na}_2\text{CO}_3 \longrightarrow 2\text{CH}_3\text{COONa} + \text{CO}_2 + \text{H}_2\text{O}$$
 Reaction in test tube B:  

$$\text{Ca}(\text{OH})_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$$

Note: With excess  $\text{CO}_2$  the milkyiness will disappear.  

$$\text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{HCO}_3)_2$$

- Ethanol does not react with sodium carbonate, so no change will be observed.
- The lime water is prepared by dissolving quick lime (calcium oxide) in water and decanting the supernatant liquid.

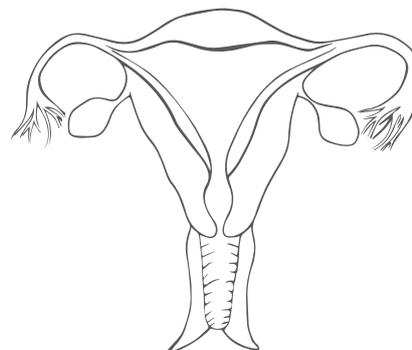
27. Name various plant hormones. Also give their physiological effects on plant growth and development [5]

Ans :

- Four different plant hormones:
  - Auxin
  - Gibberellin
  - Cytokinin
  - Abscisic acid
- Auxins:** Plant hormones produced in minute quantity at the shoot tip and growing parts of the plant body such as the young leaves. They accelerate growth in plants.
- Gibberellins:** They are responsible for bringing about growth and they also cause stem elongation. They make genetically dwarf plants grow tall and are responsible for breaking the dormancy of seeds. Gibberellins are produced in embryos of seeds, roots and young leaves near the shoot tip.

- Cytokinins:** These hormones are also called growth promoters and are mainly responsible for cell division. They bring about cell division in combination with auxins. These are produced in developing fruits, seed and are synthesised in the root.
- Abscisic Acid:** In contrast to auxins, gibberellins and cytokinins, abscisic acid is known as a growth retarder or growth inhibitor. Its effects include wilting of leaves.

28. (a) In the given figure, name and label the parts that perform the following functions:

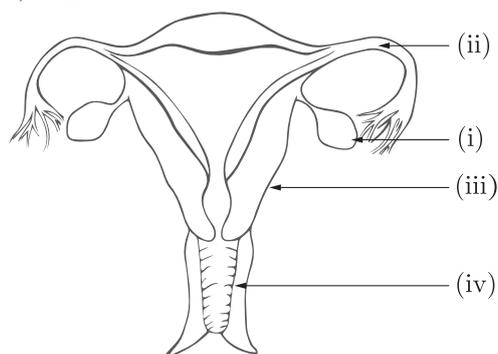


- Production of egg
- Site of fertilisation
- Site of implantation
- Entry of the sperms [5]

(b) What changes are observed in the uterus subsequent to the implantation of a young embryo?

Ans :

- Ovary
  - Fallopian tube
  - Uterus
  - Vagina



(b) Post implantation of a young embryo, circulation of blood around the uterus is increased. Soon, embryo derives its nutrition from the mother's blood with the help of a special tissue called placenta. This contains villi-like structure embedded in the wall of the uterus. Tissue and blood capillaries of the uterus surround the villi. Through the villi, nutrients and oxygen from the mother's blood pass on to the embryo. The wastes produced by the embryo is passed on to the mother's blood through the placenta.

or

- What is reproduction? Explain two advantages of sexual reproduction over asexual reproduction.
- Describe the process of regeneration in planaria.

Explain how this process is different from reproduction. [5]

Ans :

- (a) • **Reproduction:** A biological process by virtue of which organisms produce forms of life similar to themselves.
- **Two advantages of sexual reproduction:**
  - (i) It is a source of larger number of variations in the population.
  - (ii) It gives survival advantages to the species/ helps in continuity of the species.
- (b) • When planaria gets cut into pieces, many of its pieces grow into separate individuals. The specialised cells proliferate and the mass of cells gets differentiated into various cells and tissues. These changes take place in the organised sequence referred to as development.
- Regeneration is not the same as reproduction as most of the organisms would not depend on being cut up to be able to reproduce.

29. What is Tyndall effect? Explain. List two examples where this effect can be observed. [5]

Ans :

**Tyndall effect:** The phenomenon of scattering of light by colloidal particles is called Tyndall effect. The colour of the scattered light depends on the size of the scattering particle and the wavelength of the light wave. The light waves with shorter wavelength, for example, violet and blue are scattered more easily, than those with the longer wavelength like orange and red. Also if particles are of a bigger size, then they scatter light of a longer wavelength, and very fine particles scatter blue light of a shorter wavelength. If the size of the scattering particles is large enough, then the scattered light may appear white.

Examples of Tyndall effect:

- (a) When light enters a dark room through a small hole, the dust particles present in the air scatter light and the path of the light becomes visible.
- (b) In a dense forest in the morning, when sunlight passes through a canopy of trees, the tiny water droplets present in the mist scatter the light rays.

30. Why does a magnetic compass needle pointing North and South in the absence of a nearby magnet get deflected when a bar magnet or a current carrying loop is brought near it? Describe four salient features of the concept of magnetic field lines. [5]

Ans :

1. Current carrying loops and the compass needle behave like a bar magnet and both have their associated magnetic field lines. When a bar magnet (or a current carrying loop) is brought near a magnetic compass, its magnetic field modifies the already existing Earth's magnetic field and results in the deflection of magnetic compass needle.
2. Magnetic field has both magnitude and direction, which is explained by the concept of magnetic field lines. The four salient features of the concept are given below:
  - (a) Magnetic field lines emerge from the north

pole and merge at the south pole of a magnet.

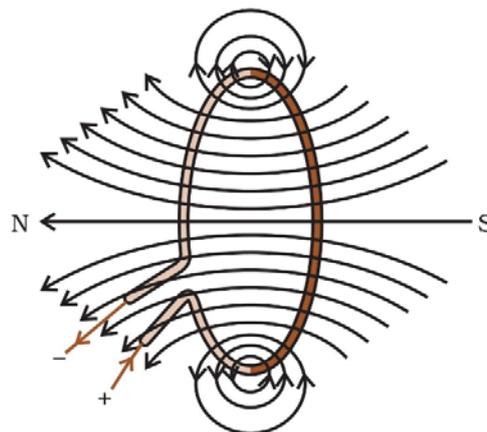
- (b) The magnetic field strength is diagrammatically represented by the degree of closeness of the magnetic field lines.
- (c) Magnetic field lines can never intersect each other as two values of net magnetic field at a single point (i.e. the point of intersection) cannot be possible (only one value, a unique net value, is possible).
- (d) If, in a given region, magnetic field lines are shown to be parallel and equidistant, the field is considered to be uniform in that region.

or

Explain, with the help of a labelled diagram, the distribution of magnetic field due to a current through a circular loop. Why is it that if a current carrying coil has n turns, the field produced at any point is n times as large as that produced by a single turn? [5]

Ans :

The magnetic field due to a current carrying circular loop is as shown in the diagram. It is clear that the field lines are circular near the loop (wire) but straight and parallel near its centre.



The field produced at a point due to a current carrying coil of n turns is n times as large as that of the field produced by a single turn. It is because the same current flows through each turn of the coil and the magnetic field at a point is the resultant of the magnetic fields produced by each turn. Since each turn produces a field of the same magnitude and direction at a point, these fields get added up.

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