

Class X Session 2025-26
Subject - Science
Sample Question Paper - 08

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A

1. While preparing a temporary stained mount of a leaf epidermal peel, the extra stain is removed by
a) washing with water
b) washing with calcium chloride solution
c) soaking with filter paper
d) absorbing with cotton wool
2. Which of the following is not a nitrogenous base?
a) Cytosine
b) Guanine
c) Adenine
d) Deoxyribose sugar
3. The percentage of solar radiation absorbed by all the green plants for the process of photosynthesis is about:
a) 10%
b) 1%
c) 5%
d) 8%
4. Which of the following statement(s) is (are) true about respiration?
i. During inhalation, ribs move inward and the diaphragm is raised
ii. In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from the blood into the alveolar air
iii. Haemoglobin has a greater affinity for carbon dioxide than oxygen
iv. Alveoli increase surface area for exchange of gases
a) (i) and (iii)
b) (i) and (iv)
c) (ii) and (iv)
d) (ii) and (iii)
5. Which of the following is/are terrestrial ecosystem(s)?
A. Forest
B. Aquarium
C. Grassland
D. Desert
a) A, B and D
b) A, C and D

c) A and D

d) A and B

6. Match the following with correct response.

[1]

Column A	Column B
(i) Cretinism	(a) Over secretion of growth hormone
(ii) Gigantism	(b) Under secretion of ADH
(iii) Exophthalmia	(c) Over secretion of thyroxin
(iv) Diabetes insipidus	(d) Deficiency of thyroxin

a) (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)

b) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

c) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)

d) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)

7. Electrical impulse travels in a neuron from -

[1]

a) Dendrite → cell body → axon → axonal end

b) Dendrite → axon → axonal end → cell body.

c) Cell body → dendrite → axon → axonal end.

d) Axonal end → axon → cell body → dendrite

8. **Assertion (A):** Fusion of gametes gives rise to a single cell called zygote.

[1]

Reason (R): Zygote is a fertilised ovum.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

9. **Assertion (A):** Biotic components of ecosystem continuously require energy to carry on life processes.

[1]

Reason (R): Abiotic components are the non-living factors of the ecosystem.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

10. Suggest any two contraceptive methods to control the size of human population and explain them.

[2]

11. i. Write two harmful effects of using plastic bags on the environment. Suggest alternatives to the usage of plastic bags.

[2]

ii. List any two practices that can be followed to dispose off the waste produced in our homes.

OR

In the following food chain, 20J of energy was available to the hawks. How much would have been present in the plants?

Plants → rats → snakes → hawks



12. What will happen if intake of iodine in our diet is low?

[2]

13. In pea plant, round seed is dominant over the wrinkled. If a cross is carried out between these two plants, give answer to the following questions.

[3]

i. Mention the genes for the traits of parents.

ii. State the trait of F_1 hybrids.

iii. Write the ratio of F_2 progeny obtained from this cross. What is the name of the cross?

14. How to destarch the leaves for an experiment to show that sunlight is necessary for photosynthesis? [3]

15. **Read the following text carefully and answer the questions that follow:** [4]

A student crossed pea plants having round and yellow seeds with pea plants having wrinkled and green seeds. He found that only one type of seeds were produced in the F_1 generation. When these F_1 generation pea plants were self - pollinated with each other, then in addition to the seed type of F_1 generation, some new types of seed combinations were also obtained in the F_2 generation.

i. Write any two contrasting visible characters other than the ones shown above, taken by Mendel for his experiment. (1)

ii. Mention the dominant traits observed in F_1 generation. (1)

iii. Give reason why the traits which were not visible in the seeds of F_1 generation reappeared in the seeds of F_2 generation. Write the ratio of different types of seeds obtained in F_2 generation in this case. (2)

OR

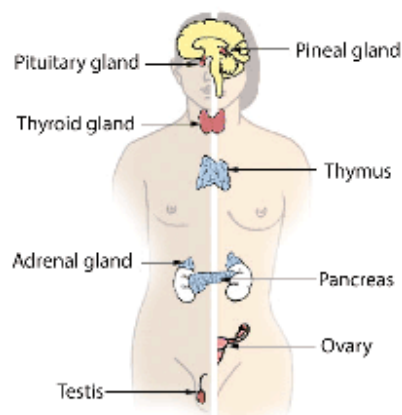
What is meant by the terms (I) dominant, and (II) recessive traits? Explain. (2)

16. a. List the sequence of events in the uterus of a human female from fertilisation of egg till childbirth. [5]

b. State the changes that are observed in the uterus if fertilisation of egg does not occur.

OR

Given below is a diagram of the human endocrine system.



Using the given diagram, answer the following questions:

i. How pituitary gland regulates the growth of the body?

ii. Which hormone is responsible for the carbohydrate, protein, and fat metabolism in the body?

iii. Which pair of glands prepare the body to deal with emergency situations?

iv. Which gland secretes insulin and what does it do in the body?

v. What is the function of endocrine glands?

Section B

17. When sodium hydrogen carbonate is added to ethanoic acid a gas evolves. [1]

Consider the following statements about the gas evolved?

A. It turns lime water milky.

B. It is evolved with a brisk effervescence.

D. It is also a by-product of respiration.

a) (B) and (D) only

c) (A), (B) and (D)

18. Soap doesn't work well with woollen garments because:

[1]

B. It is acidic in nature and woollen garments have basic dyes.

a) (A)

b) (B)

c) None of these

d) Both (A) and (B)

19. The melting point of NaCl is:

[1]

a) 1047 K

b) 100 K

c) 1000 K

d) 1074 K

20. The slag obtained during the extraction of copper pyrites is composed mainly of:

[1]



a) CuSiO_3

b) SiO_2 c) Cu_2S d) FeSiO_3

21. Match the following with the correct response:

[1]

Column A	Column B
(i) Ionic bond	(a) NH_3
(ii) Polar covalent bond	(b) C_{60}
(iii) Non-polar bond	(c) N_2
(iv) Fullerene	(d) NaCl

a) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)

b) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)

c) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

d) (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)

22. The correct formula of ethanol is:

[1]

a) $\text{C}_2\text{H}_6\text{OH}$

b) $\text{C}_2\text{H}_5\text{OH}$ c) CH_3OH

d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

23. Plaster of Paris hardens by

[1]

a) Passing of CO_2 gas

b) Changing into CaCO_3

c) Combining with water

d) Releasing out a molecule of water

24. **Assertion (A):** While dissolving an acid or base in water, the acids must always be added slowly to water with constant stirring. [1]

Reason (R): Dissolving an acid on a base in water is a highly exothermic reaction.

- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false. d) A is false but R is true.
25. When a piece of limestone reacts with dilute HCl, a gas X is produced. When gas X is passed through lime water then a white precipitate Y is formed. On passing excess of gas X, the white precipitate dissolves forming a soluble compound Z. [2]
- a. What are X, Y and Z?
- b. Write equations for the reactions which take place :
- i. When limestone reacts with dilute HCl.
- ii. When gas X reacts with lime water to form white precipitate Y.
26. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case. [3]
- i. In thermite reaction, iron (III) oxide reacts with aluminium and gives molten iron and aluminium oxide.
- ii. Magnesium ribbon is burnt in an atmosphere of nitrogen gas to form solid magnesium nitride.

OR

A solution of a substance 'X' is used for whitewashing

- i. Name the substance 'X' and writes its formula.
- ii. Write the reaction of the substance 'X' named in (i) above with water.
27. In a chemistry laboratory, students were instructed to set up three experiments, details of which are given below: [3]

Experiment No.	Set up details
1.	2 iron nails in a cork capped test tube + Tap water immersing the nails +
2.	2 iron nails in a cork capped test tube + Boiled water immersing the nails + Oil on top of water layer.
3.	2 iron nails In a cork capped test tube + Cotton wool on top of the iron nails + Granules of calcium chloride on cotton wool.

Indicate the changes observed in the nails kept in all the three setups, with reasons.

28. **Read the following text carefully and answer the questions that follow:** [4]

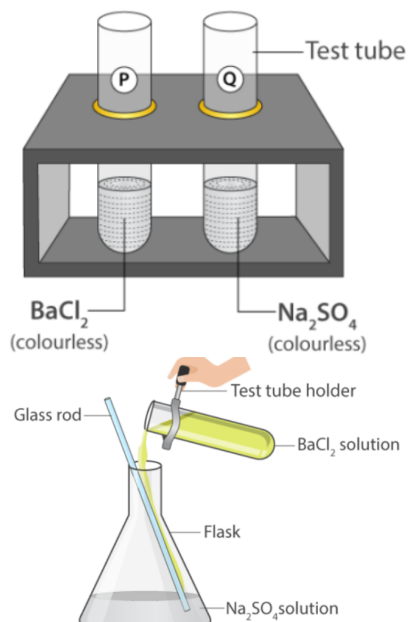
When a more reactive element displaces a less reactive element from its compound, it is called a displacement reaction. The reaction is of two types. Single displacement reaction and double displacement reaction.

Iron being more reactive than copper displaces copper from an aqueous solution of copper sulphate. This is an example of a single displacement reaction.

On adding silver nitrate solution to sodium bromide, a yellow ppt of silver bromide and solution of sodium nitrate is formed. This is an example of a double displacement reaction.

- i. When dil. sulphuric acid is added to pieces of iron sulphide, hydrogen sulphide gas is produced and soluble ferrous sulphate is formed. Which chemical reaction is involved in this process? (1)
- ii. Mention reaction which is used for the preparation of oxygen gas in the laboratory. (1)

iii. What are the products formed in the double displacement reaction discussed below? (2)



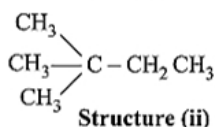
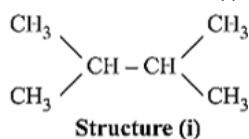
OR

Which elements displace aluminum from its salt? (2)

29. i. Name a commercially important carbon compound having functional group -OH and write its molecular formula. [5]
- ii. Write chemical equation to show its reaction with
1. Sodium metal
 2. Excess conc. sulphuric acid
 3. Ethanoic acid in the presence of an acid catalyst
 4. Acidified potassium dichromate
- iii. Also write the name of the product formed in each case.

OR

- i. Draw the structure of the following compounds:
- a. Butanoic acid
 - b. Chloropentane
- ii. How are structure (i) and structure (ii) given below related to one another? Give reason to justify your answer.



Draw one more possible structure for above case.

- iii. Differentiate between saturated and unsaturated carbon compounds on the basis of their general formula.

Section C

30. A real image is formed by the light rays after reflection or refraction when they: [1]
- A. actually meet or intersect with each other.
 - B. actually converge at a point.
 - C. appear to meet when they are produced in the backward direction.

D. appear to diverge from a point.

Which of the above statements are correct?

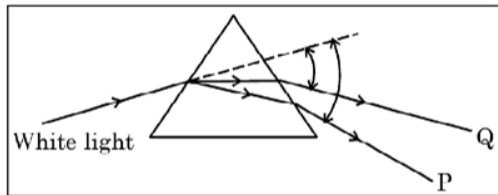
a) (A) and (B)

b) (B) and (D)

c) (B) and (C)

d) (A) and (D)

31. In the following diagram showing dispersion of white light by a glass prism, the colours **P** and **Q** respectively are- [1]



a) Violet and Red

b) Orange and Green

c) Red and Blue

d) Red and Violet

32. **Assertion (A):** A direction current flows through a metallic rod, produced a magnetic field only outside the rod. [1]

Reason (R): There is no flow of charge carriers inside the rod.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

33. State reasons to explain these observations. [2]

- Our eye is more sensitive to yellow colour but even then danger signals are red in colour.
- Violet colour is seen at the bottom of the spectrum when light is displaced by a prism.

34. A copper wire has diameter 0.5 mm and resistivity $1.6 \times 10^{-8} \Omega \text{ m}$. What will be the length of this wire to make its resistance 10Ω ? How much does the resistance change if the diameter is doubled? [2]

OR

Several electric bulbs designed to be used on a 220V electric supply line are rated 10W. How many lamps can be connected in parallel with each other across the two wires of 220V line if the maximum allowable current is 5A?

35. i. A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. The conductor gets displaced towards left when a current is passed through it. What will happen to the displacement of the conductor if the [3]

- current through it is increased?
- horse-shoe magnet is replaced by another stronger horse-shoe magnet?
- direction of current through it is reversed?

ii. Name and state the rule for determining the direction of force on a current carrying conductor in a magnetic field.

36. Why do we observe difference in colours of the Sun during sunrise, sunset and noon? [3]

37. i. State the rule to determine the direction of a [3]

- magnetic field produced around a straight conductor carrying current
- force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it, and
- current induced in a coil due to its rotation in a magnetic field.

ii. State the purpose for which the following rules are used

- a. Right hand thumb rule
- b. Fleming's left hand rule
- c. Fleming's right hand rule

38. **Read the following text carefully and answer the questions that follow:**

[4]

When electric current flows in a purely resistive circuit electrical energy gets fully converted into heat energy.

The amount of heat produced (H) in the circuit is found to be directly proportional to (i) the square of current I^2

(ii) the resistance (R) of the conductor and (iii) the time (t) for which current flows. In other words $H = I^2 R t$.

Electrical devices such as an electric fuse, electric heater, electric iron etc. are all based on this effect called heating effect of electric current.

- a. List two properties of heating elements. **(1)**
- b. List two properties of electric fuse. **(1)**
- c. Name the principle on which an electric fuse works. Explain how a fuse wire is capable of saving electrical appliances from getting damaged due to accidentally produced high currents. **(2)**

OR

The power of an electric heater is 1100 W . If the potential difference between the two terminals of the heater is 220 V , find the current flowing in the circuit. What will happen to an electric fuse of rating 5 A connected in this circuit? **(2)**

39. A concave lens of focal length 60 cm is used to form an image of an object of length 9 cm kept at a distance of 30 cm from it. Use lens formula to determine the nature, position and length of the image formed. Also draw labelled ray diagram to show the image formation in the above case.

[5]

OR

- i. A person suffering from myopia (near-sightedness) was advised to wear the corrective lens of power -2.5 D. A spherical lens of the same focal length was taken in the laboratory. At what distance should a student place an object from this lens so that it forms an image at a distance of 10 cm from the lens?
- ii. Draw a ray diagram to show the position and nature of the image formed in the above case.

Solution

Section A

1.
(c) soaking with filter paper
Explanation:
Filter paper absorbs the extra stain.
2.
(d) Deoxyribose sugar
Explanation:
A nitrogenous base is simply a nitrogen-containing molecule that has the same chemical properties as a base. They are particularly important since they make up the building blocks of DNA and RNA: adenine, guanine, cytosine, thymine, and uracil.
3.
(b) 1%
Explanation:
The percentage of solar radiation absorbed by all the green plants for the process of photosynthesis is about one percent. The green plants (producers) use this solar energy for the process of photosynthesis, convert it into food energy and make the energy available to the rest of the ecosystem.
4.
(c) (ii) and (iv)
Explanation:
Statement (i) is wrong because ribs move outward and the diaphragm is lowered during inhalation. Similarly, statement (iii) is wrong because hemoglobin has a greater affinity for Oxygen than CO₂.
5.
(b) A, C and D
Explanation:
All given ecosystems are terrestrial ecosystems. Forest, grassland and desert are natural ecosystems. An aquarium is an example of a human-made (artificial) ecosystem.
6.
(c) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
Explanation:
 - It is a condition of severely stunted physical and mental growth owing to untreated congenital deficiency of thyroid hormone.
 - Gigantism is a rare condition that causes abnormal growth in children caused by growth hormones.
 - Protrusion of the eyeball from the orbit, caused by disease, especially hyperthyroidism, or injury.
 - A disorder of salt and water metabolism marked by intense thirst and heavy urination.
7. (a) Dendrite → cell body → axon → axonal end
Explanation:
Dendrite receive the stimulus through receptors and transfer to cell body. Long axon passes the impulse to axonal end to transfer to another axon.

8.

(b) Both A and R are true but R is not the correct explanation of A.

Explanation:

The fusion of a sperm with an ovum to form a zygote during sexual reproduction is called fertilisation. The zygote is fertilised ovum or fertilised egg. The zygote grows and develops to form a new baby.

9.

(b) Both A and R are true but R is not the correct explanation of A.

Explanation:

Both A and R are true but R is not the correct explanation of A.

10. **Barrier method:** In this method, the fertilisation of the ovum and the sperm is prevented with the help of barriers such as a condom.

Implants and surgical methods: Contraceptive devices, such as a loop and a copper-T rod, are placed in the uterus to prevent pregnancy. However, they can cause side effects to the uterus.

Some surgical methods such as vasectomy (blocking of the vas deferens in the male body to prevent the transfer of sperms) and tubectomy (blocking of fallopian tubes in the female body to prevent the egg from reaching the uterus) can also be used to block the gamete transfer.

11. i. Harmful effects of plastic bags:

- Plastics do not undergo degradation, thus stay in soil for many years. This may affect the soil fertility and degrades the soil quality.
- When plastic artifacts enter the drainage and sewerage system, they block the pipes and drains causing water logging.
- Littering of plastics in open spaces creates unhygienic conditions, as it acts as breeding ground for insects and mosquitoes.

We can reduce the use of plastic bags and carry jute bags and paper bags to carry items from the market.

ii. Measures taken for proper disposal of waste produced at our homes are:-

- Prepare a compost pit for kitchen wastes.
- Safe disposal of plastic bags.
- Segregation of biodegradable and non-biodegradable wastes.
- Fruit peels can be placed near trees or plants, which on decomposition will enrich the soil with nutrients.
- Recycling of paper wastes.

OR

We can calculate the amount of energy present at each trophic level by 10 percent law. Energy present in hawks is 20 J, in snakes, it is $20 \times 10 = 200$ J, in rats it is $200 \times 10 = 2000$ J and in plants amount of energy is $2000 \times 10 = 20000$ J.

12. Thyroxine hormone needs Iodine for its synthesis. If its amount will be low in the diet then the hormone production will lower down causing hypothyroidism and goitre.

13. i. RR for homozygous pure round. And rr for homozygous pure wrinkle pea plant.

ii. Rr (hybrid) - heterozygous. All are round since round is dominant over wrinkled.

iii. 3:1 (phenotypic ratio), 1:2:1 (genotypic ratio) The name of this cross is monohybrid cross.

14. Destarching occurs when part of a plant is "deprived of starch, as by translocation". It is also the process of eliminating starch reserves in a plant for experiments concerning photosynthesis. This is done by leaving the plant in a dark place for a long period of time.

15. i. i. Flower color (purple or white)

ii. Plant size (tall or dwarf)

ii. In F_1 generation round and Yellow seeds were observed that mean round and Yellow are dominant traits.

iii. The traits which were not show in F_1 generation were recessive traits that do not show their presence in front of dominant genes.

Ratio of types if seeds in F_2 generation is 9 : 3 : 3 : 1

OR

I. The trait that first appears or is visibly expressed in the organism is called the dominant trait.

II. The trait that is present at the gene level but is masked and does not show itself in the organism is called the recessive trait.

16. a. The sequence of events in the uterus of a human female from fertilisation of egg till childbirth are:

- Uterus prepare itself with the development of a thick lining which is richly supplied with blood to nourish the growing embryo.
 - The embryo gets nutrition from mother's blood with the help of a special tissue called placenta.
 - Disc like structure in the uterine wall contain villi on the embryo's side of the tissue and blood spaces/ capillaries from mother's sides.
 - It passes glucose and oxygen from mother to the embryo and waste substances from embryo to the mother.
 - The child gets developed inside the mother's body in nine months and is born as a result of rhythmic contractions of the muscles in the uterus.
- b. If fertilization of the egg does not occur, the thick and spongy lining of the uterus break and comes out through vagina as blood and mucous i.e. menstruation occurs.

OR

- Pituitary gland secretes growth hormone that regulates the growth and development of the body.
- Thyroxine hormone is secreted by the thyroid gland that is responsible for the carbohydrate, protein, and fat metabolism in the body.
- A pair of adrenal glands located on kidneys prepares the body to deal with stress, anxiety, and emergency situations.
- The pancreas secretes insulin that regulates our blood sugar levels.
- Endocrine glands are ductless glands that secrete hormones to regulate many body functions, including growth, development, reproduction, and metabolism.

Section B

17. **(c)** (A), (B) and (D)
Explanation:
 (A), (B) and (D)
18. **(a)** (A)
Explanation:
 Soap is basic in nature. Acid dyes are used to dye protein fibres such as silk, wool, angora, mohair, feathers, etc. Hence, soap doesn't work well with woolen garments. The soap gets neutralized by the acidic dyes.
19. **(d)** 1074 K
Explanation:
 The melting point of NaCl is 801°C or 1074 K.
20. **(d)** FeSiO₃
Explanation:
 The sulphide ore of copper-containing iron is mixed with silica before heating in a reverberatory furnace. Iron oxide forms a slag of iron silicate (FeSiO₃).
 The reaction is: $\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3$
21. **(b)** (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
Explanation:
- NaCl has **ionic bonds** between the sodium ion and the chloride ion.
 - Ammonia has **polar covalent bonds** between the nitrogen atom and hydrogen atoms.
 - Nitrogen molecule has **non-polar covalent bonds** between the two nitrogen atoms since the two atoms are alike.
 - C₆₀ is a member of **fullerenes** (Allotropes of carbon). Buckminsterfullerene contains a cluster of 60 carbon atoms joined together to form spherical molecules.

22.

(b) C_2H_5OH

Explanation:

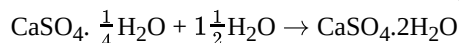
C_2H_5OH

23.

(c) Combining with water

Explanation:

When water is added to the Plaster of Paris, it sets into a hard mass due to its hydration to form crystals of gypsum.

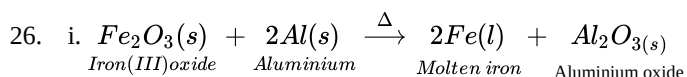
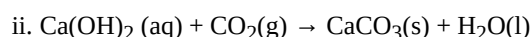
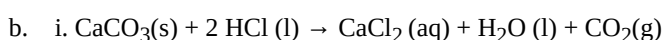


24. (a) Both A and R are true and R is the correct explanation of A.

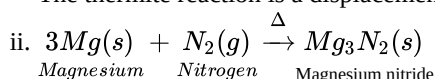
Explanation:

Both A and R are true and R is the correct explanation of A.

25. a. Compound X is Carbon Dioxide (CO_2); Compound Y is Calcium Carbonate ($CaCO_3$); Compound Z is Calcium Hydrogen Carbonate [$Ca(HCO_3)_2$].



The thermite reaction is a displacement reaction.

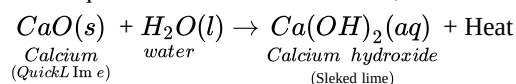


The formation of magnesium nitride as above is a combination reaction.

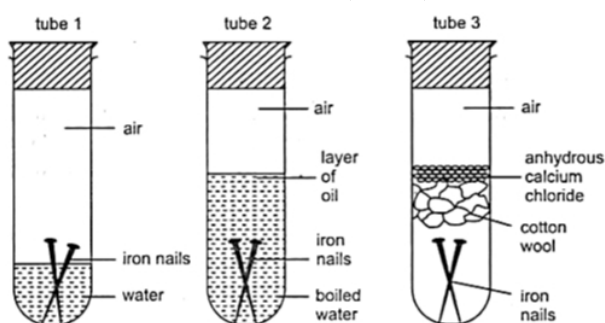
OR

i. The substance whose solution in water is used for white washing is calcium oxide. Its formula is **CaO**.

ii. When quicklime is mixed with water, the following reaction takes place:



27.

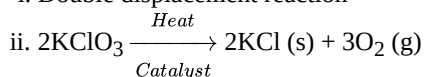


Test tube 1: Iron nails would get rusted that is corroded as they are exposed to moisture and air.

Test tube 2: Iron nails won't get rusted as they are exposed to water that is devoid of oxygen due to boiling and further the layer of oil is not letting oxygen come into contact with the water in which nails are immersed.

Test tube 3: Iron nails won't get rusted or corroded because they are not exposed to moisture and air.

28. i. Double displacement reaction



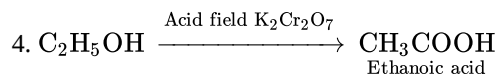
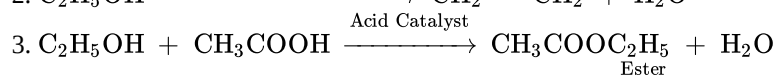
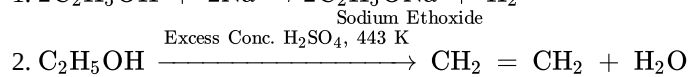
It is a decomposition reaction and endothermic in nature.

iii. Barium Sulphate, Sodium Chloride

OR

Ca elements displace aluminium from its salt.

29. i. Ethanol - C_2H_5OH



- OR

- $$\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{O} \\ & | & & | & & | & & | \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - & \text{C} = \text{OH} \\ & | & & | & & | & & | \\ & \text{H} & & \text{H} & & \text{H} & & \end{array}$$

- $$\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{Cl} & & \text{H} \\ & | & & | & & | & & | & & | \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} = \text{H} \\ & | & & | & & | & & | & & | \\ & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \end{array}$$

- ## Section C

- $$l = \frac{R\pi d^2}{4\rho} = \frac{10}{4} \times \frac{22}{7} \times \frac{(5 \times 10^{-4})^2}{1.6 \times 10^{-8}}$$

$$R = \frac{\rho l}{A} = \frac{\rho l}{\frac{\pi d^2}{4}} = \frac{4\rho l}{\pi d^2}$$

$$l = \frac{220}{28} \times \frac{25}{1.6} = 122.77m$$

If the diameter of wire is doubled, resistance will become $\frac{1}{4}$ th of the original (since $R \propto \frac{1}{A}$ or $R \propto \frac{1}{d^2}$).

Decrease of resistance will be $10 - \frac{10}{4} = 7.5\Omega$

OR

Let current through each bulb be I.

$$P = VI, 10 = 220 I$$

$$I = \frac{1}{22} A$$

Let n such bulbs be connected in series.

Current through n bulbs = 5A

n (current in 1 bulb) = 5

$$n \frac{1}{22} = 5$$

$$n = 110$$

110 such bulbs can be lighted within allowable limit of 5A.

35. i. 1. The force acting on a current-carrying conductor placed perpendicular to a magnetic field increases with the increase in the current flowing through a conductor.
 2. When a horseshoe magnet is replaced by a stronger magnet, then the magnetic field increases. Thus, the force acting on the conductor increases.
 3. If the length of the conductor increases then the force acting on the conductor also increases.
- ii. Fleming's left hand rule: Stretch the forefinger, middle finger and the thumb of your left hand mutually perpendicular to each other. If the forefinger indicates the direction of magnetic field and the middle finger indicates the direction of current, then the thumb will indicate the direction of motion of conductor.
36. This is because of scattering of light near the horizon, most of the blue light and shorter wavelengths are scattered away by the particles present in the atmosphere during sunrise and sunset. So, the light that reaches our eyes is of longer wavelength (e.g. red). This gives rise to the reddish appearance of the sky. But during the day sun appears white as sun is near the surface of earth nearly overhead, thus the sunlight passes through much smaller distance and thus the scattering is much less and sun appears white.
37. i. a. Right hand thumb rule will determine the direction of a magnetic field around a straight conductor carrying current.
 b. Fleming's left hand rule will determine the direction of a force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it.
 c. Fleming's right hand rule will determine the direction of current induced in a coil due to its rotation in a magnetic field.
- ii. a. The **right-hand thumb** rule is used to find the directions of the magnetic field around a current-carrying straight conductor.
 b. **Fleming's left-hand rule** (motor rule): helps in understanding the direction of the magnetic force acting on a conductor.
 c. **Fleming's right-hand rule** (dynamo rule) helps in understanding the direction of induced current when a conductor moves in a magnetic field.
38. a. Higher resistivity than pure metals
 Do not oxidise (burn) at high temperature.
 b. Higher resistivity than pure metals
 Low melting point.
 c. Heating effect of electric current
 When high current flows in the circuit accidentally, the fuse wire melts and breaks the circuit.

OR

$$P = 1100 W; V = 220 V, I = ?$$

$$P = VI$$

$$I = \frac{P}{V} = \frac{1100 W}{220 V} = 5 A$$

No effect on the fuse of 5A rating.

39. Concave lens-

$$\text{focal length } (f) = -60 cm$$

$$\text{Object length } (h) = 9 cm$$

$$\text{Object distance } (u) = -30 cm$$

Lens formula, $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$$\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$$

$$v = \frac{-1}{\frac{1}{60} + \left(\frac{-1}{30}\right)}$$

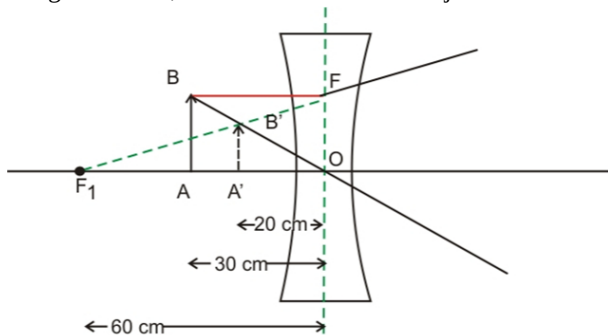
$$m = \frac{v}{u} = \frac{-20}{-30} = \frac{2}{3}$$

$$m = \frac{h'}{h} \Rightarrow h' = m \times h$$

$$h' = \frac{2}{3} \times 9$$

$$h' = 6 \text{ cm}$$

Image is virtual, erect and smaller than object.



OR

i. Given:

distance of image from the lens, $i = 10 \text{ cm}$

power of the lens, $P = -25 \text{ D}$

Now the focus of the lens:

$$P = \frac{1}{f}$$

where:

f = focal length

$$-25 = \frac{1}{f}$$

$$f = -0.04 \text{ m} = -4 \text{ cm}$$

From the equation of lens:

$$\frac{1}{f} = \frac{1}{i} + \frac{1}{o}$$

where:

o = distance of the object

$$-\frac{1}{4} = \frac{1}{10} + \frac{1}{o}$$

$$\rho = -\frac{20}{7} \text{ cm i.e. negative sign means that the image formed is on the same side as that of the object.}$$

ii.

