

SCIENCE - CODE NO. 086
SAMPLE QUESTION PAPER - 1
CLASS - X (2026-27)

Max. Marks: 80

Time Allowed: 3 hours

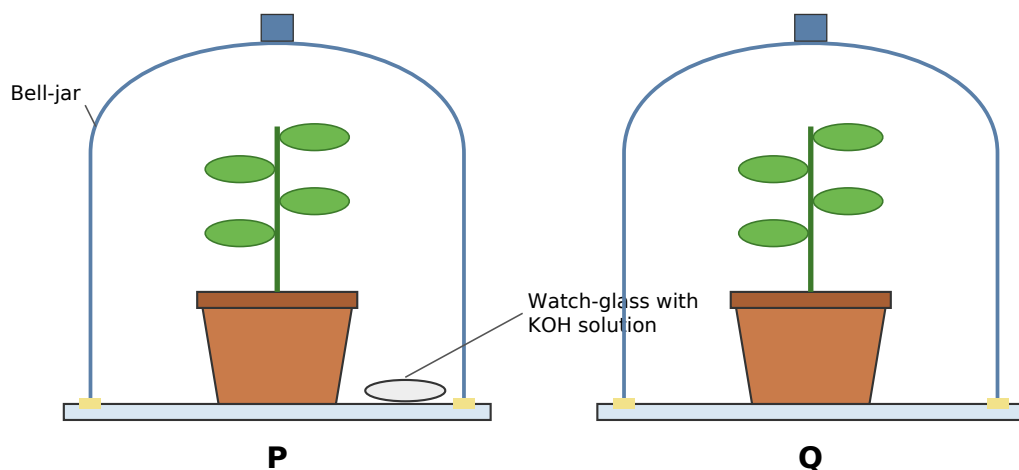
General Instructions:

- (i) This question paper consists of **39** questions in **3** sections. **Section A is Biology** (Q.1-16, 30 marks), **Section B is Chemistry** (Q.17-29, 25 marks) and **Section C is Physics** (Q.30-39, 25 marks).
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of the alternatives in such questions.
- (iii) Multiple choice and Assertion-Reason questions carry 1 mark each. Other questions carry 2, 3, 4 (case/source-based) or 5 marks, as indicated against each question.
- (iv) Answers should be brief and to the point. Draw neat, labelled diagrams wherever required.
- (v) Use of calculators is not permitted.

SECTION - A (BIOLOGY)

Questions 1 to 16

1. A sprinter develops painful muscle cramps at the end of a 100 m race. Which substance has accumulated in the muscle cells, and why? **1**
- A. Ethanol - formed in mitochondria in the presence of oxygen
B. Lactic acid - formed from pyruvate due to lack of oxygen
C. Pyruvate - formed because glucose was not broken down
D. Carbon dioxide - formed due to excess oxygen
2. Two de-starched potted plants, P and Q, are set up as shown in the figure and kept in sunlight for two hours. A leaf from each plant is then tested with iodine solution. Which observation is correct? **1**



- Both set-ups sealed air-tight with vaseline and kept in sunlight
- A. Both leaves turn blue-black.
B. Leaf of P turns blue-black; leaf of Q does not.
C. Leaf of Q turns blue-black; leaf of P does not.
D. Neither leaf turns blue-black.

3. The stomatal pore opens when 1
 A. guard cells lose water and shrink
 B. guard cells absorb water and swell
 C. epidermal cells divide rapidly
 D. the plant needs to lose less water
4. The blood sugar level of a person remains very high even after a meal low in sugar. The gland and the hormone most likely involved are 1
 A. thyroid – thyroxin
 B. pancreas – insulin
 C. adrenal – adrenaline
 D. pituitary – growth hormone
5. A gardener wants new rose plants that bear flowers early and are exactly like an excellent parent plant. The best method is 1
 A. growing plants from seeds obtained by cross-pollination
 B. vegetative propagation such as layering or grafting
 C. spore formation
 D. fragmentation of the parent plant
6. A normal human egg cell contains 1
 A. 22 autosomes + X
 B. 22 autosomes + Y
 C. 44 autosomes + XX
 D. 23 autosomes + X
7. Which step was taken worldwide to protect the ozone layer? 1
 A. Banning the use of all plastic bags
 B. Making it mandatory to manufacture CFC-free refrigerators
 C. Increasing the use of chemical fertilisers
 D. Burning garbage instead of dumping it
- The following question(s) consist of two statements – Assertion (A) and Reason (R). Answer by selecting the appropriate option given below:*
- A. Both A and R are true, and R is the correct explanation of A.
 B. Both A and R are true, and R is not the correct explanation of A.
 C. A is true but R is false.
 D. A is false but R is true.
8. **Assertion (A):** Plants raised by vegetative propagation can bear flowers and fruits earlier than plants produced from seeds. 1
Reason (R): Vegetative propagation produces offspring showing a large amount of variation.
9. **Assertion (A):** In fishes, blood goes through the heart only once during one cycle of passage through the body. 1
Reason (R): The fish heart has two chambers; blood pumped to the gills is oxygenated there and passes directly to the rest of the body.
10. A person eats a meal rich in fats. 2
 A. Name the two juices that act on these fats in the small intestine and state the role of each.
 B. What are the end-products of fat digestion?

11. Students to attempt either option A or B.

2

A. The flow chart shows the sequence of events when a hand touches a hot vessel.

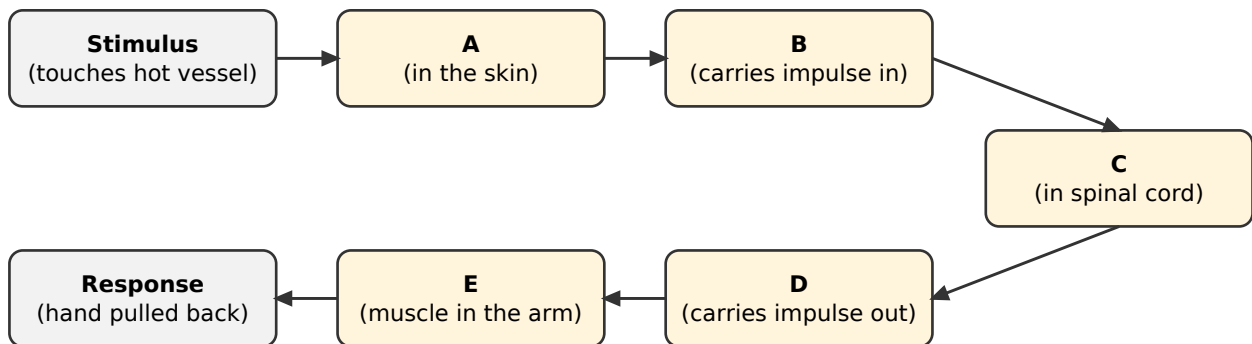


Figure: Sequence of events in a reflex action

(i) Name the parts labelled B and D. (ii) Why is this pathway formed in the spinal cord rather than in the brain?

OR

B. Name the plant hormone responsible for each of the following: (i) bending of a shoot towards light, (ii) promoting cell division in fruits and seeds, (iii) wilting of leaves, (iv) growth of the stem along with auxin.

12. Study the longitudinal section of a flower shown below.

2

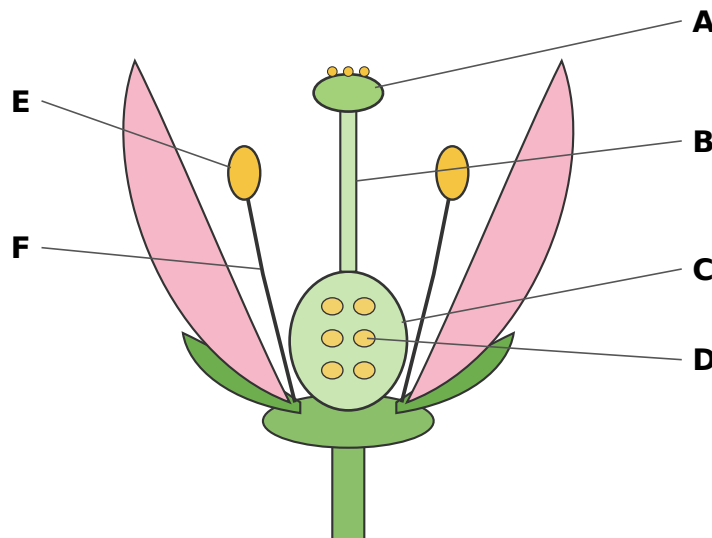


Figure: Longitudinal section of a flower

A. Name the parts labelled A and C. Which labelled parts together form the stamen?

B. What do the parts labelled D and C develop into after fertilisation?

13. A. How do water and minerals reach the top of a tall tree during the day and at night?

3

B. How is food transported in plants? Why does this process need energy, unlike transport in xylem?

14. Study the food chain: Grass → Grasshopper → Frog → Snake → Eagle.

3

A. If the frogs obtain 500 J of energy, how much energy was available at the grass level, and how much will reach the eagle?

B. What happens to the rest of the energy at each level?

C. Why is the flow of energy in this chain unidirectional?

- 15. Case study:** Ravi crossed a pure-breeding tall pea plant (TT) with a pure-breeding short pea plant (tt). All the F_1 plants were then self-pollinated, and he obtained 800 plants in the F_2 generation. **4**

A. What will the F_1 plants look like? Give a reason. **(1)**

B. How many of the 800 F_2 plants are expected to be short? **(1)**

Attempt either sub-part C or D.

C. How many of the tall F_2 plants are expected to be pure-breeding (TT)? Show your working with a checkerboard. **(2)**

OR

D. If an F_1 plant is crossed with the short parent (tt), what percentage of the progeny will be tall? Show your working. **(2)**

- 16.** Students to attempt either option A or B. **5**

A. I. Describe how urine is formed in a nephron, mentioning the role of the Bowman's capsule and the tubule. **(3)**

II. How does an artificial kidney work? State one way in which it differs from a natural kidney. **(2)**

OR

B. I. List the three events that occur during photosynthesis. **(1½)**

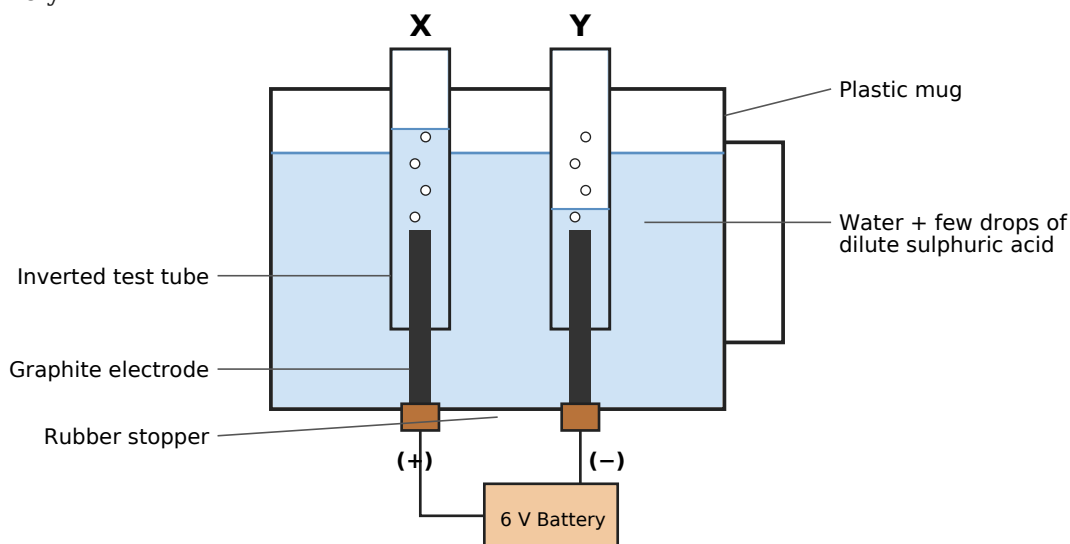
II. How do desert plants manage photosynthesis while keeping their stomata closed during the day? **(1)**

III. Describe an activity to show that chlorophyll is essential for photosynthesis. **(2½)**

SECTION - B (CHEMISTRY)

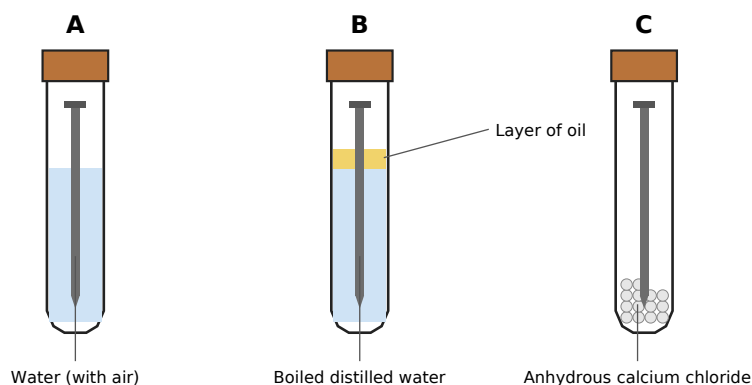
Questions 17 to 29

- 17.** The figure shows the electrolysis of water containing a few drops of dilute sulphuric acid. The gas collected in test tube Y and the ratio of volumes of gases in Y and X are respectively **1**



- A. hydrogen; 2 : 1 B. oxygen; 2 : 1
- C. hydrogen; 1 : 2 D. oxygen; 1 : 2
- 18.** An aqueous solution of a salt turns red litmus blue and has a pH of about 9. The salt is most likely **1**
- A. sodium chloride B. ammonium chloride
- C. sodium carbonate D. potassium nitrate

19. The oxide of a metal M reacts with dilute hydrochloric acid as well as with sodium hydroxide solution to form a salt and water. M is 1
- A. sodium B. magnesium
C. aluminium D. copper
20. Which one of the following is **not** a property of ionic compounds? 1
- A. They have high melting and boiling points.
B. They conduct electricity in the molten state.
C. They are soluble in kerosene and petrol.
D. They are generally hard and brittle solids.
21. The IUPAC name and the functional group of $\text{CH}_3\text{-CH}_2\text{-CHO}$ are 1
- A. propanol - alcohol B. propanal - aldehyde
C. propanone - ketone D. propanoic acid - carboxylic acid
22. When zinc granules are warmed with sodium hydroxide solution, the products are 1
- A. zinc hydroxide and oxygen B. sodium zincate and hydrogen
C. zinc oxide and water D. sodium zincate and oxygen
23. Clean iron nails are kept in three test tubes A, B and C as shown and left for a few days. 1
In which test tube(s) will the nail rust?



- A. A only B. B only
C. C only D. A and B

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C. A is true but R is false.
D. A is false but R is true.
24. **Assertion (A):** While diluting concentrated sulphuric acid, the acid should be added slowly to water with constant stirring. 1
Reason (R): The process of dissolving an acid in water is highly endothermic.
25. Write balanced chemical equations with state symbols for the following and identify the type of each reaction: 2
- A. Lead nitrate powder is heated strongly.
B. Silver nitrate solution is added to sodium chloride solution.

- 26.** Students to attempt either option A or B. **3**
- A. An organic compound X ($C_2H_4O_2$) turns blue litmus red and gives brisk effervescence with sodium hydrogencarbonate.
- (i) Identify X. (ii) Write the equation for its reaction with sodium hydrogencarbonate. (iii) Write the reaction of X with ethanol in the presence of an acid, and name the type of product formed.
- OR**
- B. (i) Write the structural formula of ethene. (ii) Vegetable oils are converted into vanaspathi ghee using hydrogen. Name this type of reaction and the catalyst used. (iii) Why are oils containing unsaturated fatty acids preferred for cooking?
- 27.** Give reasons for the following: **3**
- A. Dry hydrogen chloride gas does not change the colour of dry blue litmus paper.
- B. An iron nail dipped in copper sulphate solution becomes brownish and the blue colour of the solution fades.
- C. Aluminium is more reactive than iron, yet aluminium utensils do not corrode easily.
- 28. Case study:** Students placed small pieces of five metals P, Q, R, S and T (calcium, copper, iron, magnesium and sodium, in random order) in water under their teacher's supervision and recorded the observations: **4**

Metal	Observation
P	Reacts violently with cold water; the hydrogen evolved catches fire.
Q	Reacts with cold water less violently; the metal starts floating.
R	No reaction with cold water; reacts with hot water and starts floating.
S	No reaction with cold or hot water; reacts with steam to form a black oxide (Fe_3O_4).
T	No reaction even with steam.

- A. Identify metal P. Why is it stored under kerosene? **(1)**
- B. Arrange P, Q, R, S and T in decreasing order of reactivity and identify T. **(1)**
- Attempt either sub-part C or D.
- C. Write balanced chemical equations for the reactions of Q with cold water and S with steam. **(2)**
- OR**
- D. Why do metals Q and R start floating? Why is metal T suitable for making water pipes and vessels? **(2)**
- 29.** Students to attempt either option A or B. **5**
- A. I. How is bleaching powder manufactured? Write the equation and give two of its uses. **(2)**
- II. How is washing soda obtained from baking soda? Write the equations involved and give two uses of washing soda. **(2)**
- III. What is meant by water of crystallisation? **(1)**
- OR**
- B. I. Zinc is obtained from zinc blende (ZnS) and calamine ($ZnCO_3$). Name the process used to convert each ore into zinc oxide and write the equations. **(2)**
- II. Write the equation for the thermit reaction and state one use of it. **(1½)**
- III. In the electrolytic refining of copper, what are used as the anode, the cathode and the electrolyte? What is anode mud? **(1½)**

Questions 30 to 39

Questions 30 to 39

- 1

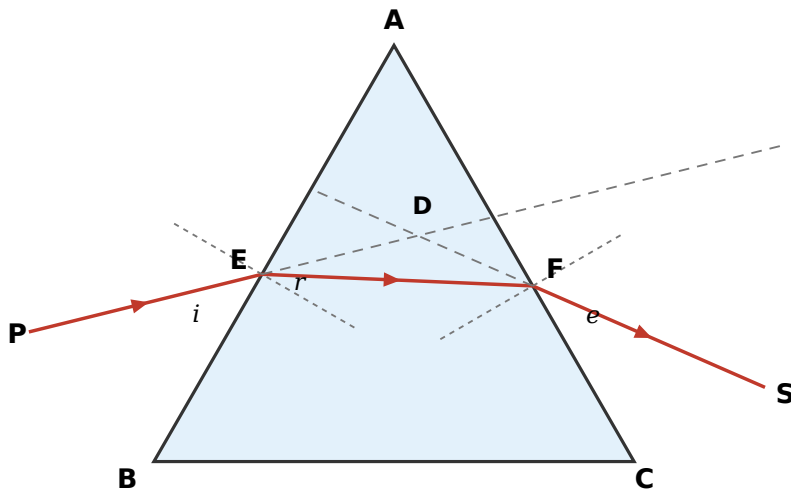


Figure: Refraction of light through a triangular glass prism

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- 1

Reason (R): The earth's atmosphere bends starlight towards the normal.

- 2

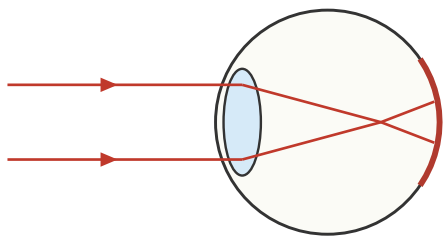


Image in front of retina

(b) Myopic eye

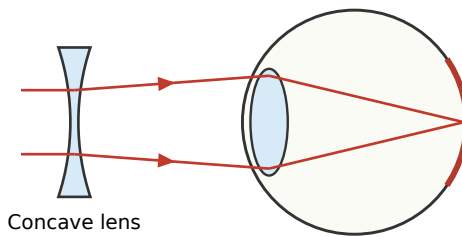


Image on retina

(c) Correction with a concave lens

- A. Name the defect and state one possible cause of it.
B. Find the focal length of the prescribed lens and state its nature.

34. Students to attempt either option A or B. 2
 A. I. Why should a fuse wire have a suitable (relatively low) melting point? II. An electric heater rated 1.5 kW is used on a 220 V line. Which fuse – 2 A, 5 A or 10 A – should be used? Justify.
OR
 B. I. Why is the metallic body of an electric press connected to the earth wire? II. What is short-circuiting and what happens to the current at that time?
35. An object 10 cm tall is placed 30 cm in front of a concave mirror of focal length 20 cm. Find the position, size and nature of the image. 3
36. A wire of length 0.5 m and area of cross-section 0.25 mm^2 has a resistance of 200Ω . 3
 A. Calculate the resistivity of its material.
 B. Using the values given – copper $1.62 \times 10^{-8} \Omega \text{ m}$, manganin $44 \times 10^{-6} \Omega \text{ m}$, nichrome $100 \times 10^{-6} \Omega \text{ m}$ – identify the material and state why it is used in heating elements.
37. In the circuit shown, a 9 V battery is connected to a resistor $R_1 = 3 \Omega$ in series with two 6Ω resistors (R_2 and R_3) connected in parallel between points P and Q. 3

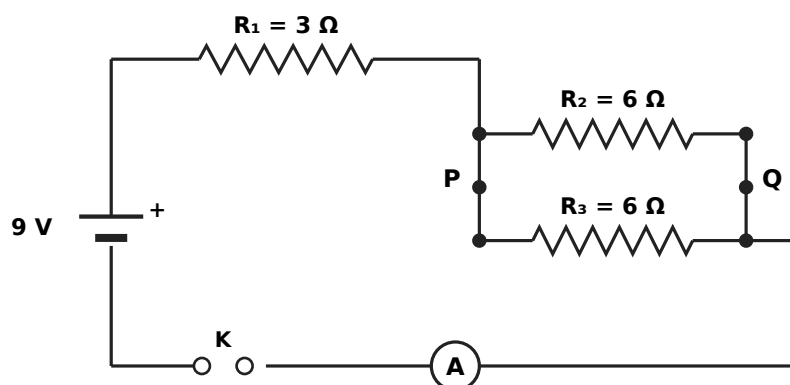


Figure: Circuit for Question 37

- A. Find the total resistance of the circuit and the current shown by the ammeter.
 B. Calculate the potential difference between P and Q and the current through R_2 .
38. **Case study:** Meera placed a lit candle at different distances in front of a convex lens and moved a screen on the other side to get a sharp image. Her readings are given below. 4

Observation	1	2	3	4
Object distance (cm)	60	40	30	15
Image distance on screen (cm)	30	40	60	No image on screen

- A. Using observation 2, find the focal length of the lens. **(1)**
 B. Find the magnification in observation 3 and state the nature of the image. **(1)**
 Attempt either sub-part C or D.
 C. Why was no image obtained on the screen in observation 4? Find the position and nature of the image in this case and give one use of this arrangement. **(2)**

OR

- D. Find the power of the lens. If a concave lens of power -2 D is placed in contact with it, what is the power and focal length of the combination? **(2)**

39. Students to attempt either option A or B.

A. I. State Fleming's left-hand rule. **(1)**

II. A beam of electrons moves horizontally towards the north through a magnetic field directed vertically upward. In which direction will the beam be deflected? Explain. **(1½)**

III. List three properties of magnetic field lines. **(1½)**

IV. Why are household appliances connected in parallel? **(1)**

OR

B. I. Distinguish between myopia and hypermetropia in terms of where the image is formed. **(1)**

II. The near point of a hypermetropic eye is 1 m. Find the power of the lens needed to correct it (near point of normal eye = 25 cm). **(2)**

III. Explain how a rainbow is formed and state why it is always seen opposite to the Sun. **(2)**

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