# Science (086)

CBSE Class 10 Board Examination 2027 – Practice Paper No. 2

**Practice Question Paper**

**Time: 3 hours** **Max. Marks: 80**

(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 the alternatives in such questions.

(3) Marks for each question are shown against it. Draw neat, labelled diagrams wherever required.

**SECTION A – BIOLOGY (Q.1 to Q.7)** Multiple choice questions. Select the correct option. (1 mark each) **[7]**

**1** While slicing vegetables, Aarav cut his finger. The bleeding stopped after a few minutes because the blood clotted and sealed the cut. Which cells circulating in the blood help to plug such leaks?

(A) Red blood cells (B) White blood cells
(C) Platelets (D) Cells lining the veins

**2** Arteries have thick, elastic walls because:

(A) they carry blood from the organs back to the heart at low pressure (B) the blood in them emerges from the heart under high pressure
(C) materials are exchanged between the blood and the body cells through their walls (D) they have valves that prevent the backward flow of blood

**3** A potted money-plant kept near a window has its shoot bending towards the light coming in through the window. This happens because the plant hormone auxin:

(A) diffuses towards the shady side of the shoot and makes the cells there grow longer (B) collects on the side of the shoot facing the light and makes the cells there grow faster
(C) is destroyed on the shady side, so the cells there stop growing (D) causes the cells on the side facing the light to wilt

**4** Which one of the following pairs of an organism and its method of asexual reproduction is **incorrectly** matched?

(A) Amoeba – binary fission (B) Plasmodium – multiple fission
(C) Spirogyra – fragmentation (D) Planaria – budding

**5** Mrs. Joshi placed a leaf of Bryophyllum on moist soil in a pot. After a few days, tiny plants grew from the notches along the margin of the leaf. This method of producing new plants is:

(A) spore formation (B) fragmentation
(C) sexual reproduction (D) vegetative propagation

**6** Pea plants having round, yellow seeds (RRYY) were crossed with pea plants having wrinkled, green seeds (rryy). The $F_1$ plants were self-pollinated. Which types of seeds appeared in the $F_2$ generation that were seen **neither** in the parents **nor** in the $F_1$?

(A) Round yellow and wrinkled green (B) Round green and wrinkled yellow
(C) Round green only (D) None; the $F_2$ had only the parental types

**7** Which one of the following pairs consists **only** of human-made (artificial) ecosystems?

(A) Crop-field and aquarium (B) Forest and pond
(C) Lake and garden (D) Pond and crop-field

**Q.8 – Q.9** Assertion–Reason. Each question has two statements – Assertion (A) and Reason (R). Select the appropriate option (A), (B), (C) or (D) given below the question. (1 mark each) **[2]**

8 **Assertion (A):** Transport of materials in plants is relatively slow compared with transport in animals.
**Reason (R):** Plants do not move, and a large proportion of a plant body consists of dead cells, so plants have low energy needs.

(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.

9 **Assertion (A):** The tendril of a pea plant coils around a support that it touches.
**Reason (R):** The part of the tendril in contact with the support grows faster than the part away from it.

(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.

**Q.10 – Q.12** Answer the following questions. (2 marks each) **[6]**

10 After the birth of her first child, Mrs. Shaikh's doctor advised her to use a copper-T so that her next pregnancy is delayed by a few years.
(a) Where in the body is a copper-T placed? State one problem it may cause.
(b) Prenatal sex determination has been prohibited by law in India. Why was such a law needed?

11 **Attempt either option A or B.**
A. A potted plant was kept inside a sealed, transparent glass jar fitted with a carbon dioxide sensor in the school laboratory. The level of carbon dioxide in the jar rose during the night and fell during the day. Explain both these observations.
**OR**
B. (a) A farmer wants his sugarcane stems to grow taller, while a plant-tissue laboratory wants the cells of its plant tissue to divide faster. Name the plant hormone useful in each case.
(b) The roots of a tree growing near a leaking underground water pipe were found to have grown towards the pipe. Name this movement. Is it a growth-dependent movement?

12 In pea plants, the trait for tall plants (T) is dominant over the trait for dwarf plants (t). Meena has a tall pea plant and wants to find out whether it is pure-breeding (TT) or not (Tt). She crosses it with a dwarf pea plant.
(a) What results should she expect if her tall plant is (i) TT and (ii) Tt? Show both crosses.
(b) The cross gave both tall and dwarf plants. If Meena's tall plant is instead self-pollinated and 400 plants are obtained, how many of them are expected to be tall, and how many of these tall plants are expected to be pure-breeding (TT)?

**Q.13 – Q.14** Answer the following questions. (3 marks each) **[6]**

13 A student looked at a drop of pond water under a microscope and observed an Amoeba and a Paramoecium feeding.
(a) Describe how Amoeba takes in and digests its food.
(b) How is the way Paramoecium takes in food different from that of Amoeba?
(c) Mushrooms and Cuscuta (amar-bel) also cannot make their own food. How does each of them obtain its food?

14 Thirteen-year-old Sunil is much shorter than all his classmates. After some tests, the doctor said that his body has been producing too little of a hormone since early childhood.
(a) Name the hormone and the condition caused by its deficiency in childhood.
(b) Name the gland that secretes this hormone. How does the hormone reach the organs on which it acts?
(c) Sunil's elder brother and sister are going through the changes associated with puberty. Name the hormones responsible for these changes in boys and in girls, and the glands that secrete them.

**Q.15** Case-based question. (4 marks) **[4]**

15 In a paddy field in the Konkan region, the following feeding relationships were observed: paddy plants are eaten by grasshoppers and by rats; grasshoppers are eaten by frogs; frogs and rats are eaten by snakes; snakes and rats are eaten by eagles.
(A) Name the producer in this field and the organisms that are at the second trophic level. (1)
(B) In one season, the paddy plants in a part of the field received 5,00,000 kJ of energy from sunlight. How much of this energy will be converted into food energy by the paddy plants, and about how much will reach the frogs through the grasshoppers? (1)
**Attempt either sub-part C or D.**
(C) A farmer observed that the number of eagles in the area is far smaller than the number of grasshoppers. Explain why. (2)
**OR**
(D) After the harvest, the farmer used to burn the leftover paddy straw. His daughter suggests that he should instead put the straw in a pit along with cow-dung. Is paddy straw biodegradable? Which organisms will act on the straw in the pit, and how will this help the paddy field? (2)

**Q.16** Long answer question. (5 marks) **[5]**

16 **Attempt either option A or B.**
A. With reference to excretion in human beings:
I. Trace the path of urine from the organ where it is formed to the point where it leaves the body. (1)
II. In which part of a nephron is blood first filtered? Name any three substances present in the initial filtrate. (1)
III. The initial filtrate contains glucose, but the urine of a healthy person does not. Explain why. (1)
IV. On a hot day in May, Kabir played cricket for three hours, sweated a lot and passed only a small amount of dark yellow urine. On a cool day in January, after drinking plenty of water, he passed a large amount of pale urine. Explain how his kidneys bring about this difference. (2)
**OR**
B. With reference to reproduction in flowering plants:
I. In Riya's garden, a hibiscus flower has both stamens and a pistil, while each flower of a papaya plant has either stamens or a pistil. What are these two types of flowers called? (1)
II. A honeybee carries pollen from a flower of one guava tree to a flower of another guava tree. Name this type of pollination, and the part of the flower on which the pollen must land. (1)
III. Describe the events that follow, from the landing of the pollen grain to the formation of the zygote. (2)
IV. A soaked gram (chana) seed was cut open. Name the parts of the embryo that develop into (a) the root and (b) the shoot. What is the role of the cotyledons? (1)

**SECTION B – CHEMISTRY (Q.17 to Q.23)** Multiple choice questions. Select the correct option. (1 mark each) **[7]**

**17** Green crystals of ferrous sulphate were heated strongly in a dry boiling tube. The crystals first lost water and then decomposed, leaving a brown solid, and a smell of burning sulphur was noticed. The gases given off in the decomposition step are:

(A) sulphur dioxide and sulphur trioxide
(B) sulphur dioxide only
(C) oxygen and sulphur dioxide
(D) hydrogen sulphide and sulphur trioxide

**18** Zinc granules were warmed with sodium hydroxide solution in a test tube. A gas was given off which burnt with a pop sound when a burning candle was brought near it. The gas and the salt formed are:

(A) oxygen and zinc hydroxide
(B) hydrogen and zinc oxide
(C) no gas is formed, as zinc does not react with a base
(D) hydrogen and sodium zincate

**19** Which one of the following metals does not react with either cold or hot water, but reacts with steam to form the metal oxide and hydrogen?

(A) Potassium
(B) Calcium
(C) Iron
(D) Copper

**20** Which one of the following pairs of compounds belongs to the same homologous series?

(A) $C_2H_6$ and $C_2H_4$
(B) $CH_3OH$ and $CH_3CHO$
(C) $C_3H_8$ and $C_4H_{10}$
(D) $C_2H_5OH$ and $CH_3COOH$

**21** Aqueous solutions of four salts are tested with pH paper. The solution of which salt will have a pH greater than 7?

(A) Sodium chloride
(B) Ammonium chloride
(C) Sodium carbonate
(D) Sodium sulphate

**22** When the equation $a\,Al + b\,O_2 \rightarrow c\,Al_2O_3$ is balanced with the smallest whole numbers, the values of $a$, $b$ and $c$ are respectively:

(A) 4, 3, 2
(B) 2, 3, 1
(C) 2, 1, 1
(D) 4, 2, 2

**23** A pair of silver anklets kept in a drawer for a few months became black. The black coating is due to the formation of:

(A) silver oxide, by reaction with oxygen in the air
(B) silver sulphide, by reaction with sulphur (compounds) in the air
(C) silver carbonate, by reaction with carbon dioxide in the air
(D) silver chloride, by reaction with moisture in the air

**Q.24** Assertion–Reason. Each question has two statements – Assertion (A) and Reason (R). Select the appropriate option (A), (B), (C) or (D) given below the question. (1 mark) **[1]**

**24** **Assertion (A):** Ethanoic acid is a weak acid compared with hydrochloric acid.
**Reason (R):** An aqueous solution of ethanoic acid turns blue litmus red.

(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.

**Q.25** Answer the following question. (2 marks) **[2]**

25 Two test tubes contain a little absolute ethanol.
(a) In the first tube, the teacher drops a small piece of sodium, about the size of a grain of rice. What will be observed? Write the balanced chemical equation for the reaction.
(b) The second tube is warmed gently in a water bath and a 5% solution of alkaline potassium permanganate is added drop by drop; its colour disappears at first. Name the organic compound formed, and state the role of alkaline potassium permanganate in this reaction.

**Q.26 – Q.27** Answer the following questions. (3 marks each) **[6]**

26 **Attempt either option A or B.**
A. Copper glance ($Cu_2S$) is an ore of copper. Copper is obtained from it simply by heating it in air, without using carbon.
(i) Write the balanced chemical equation for the first step, in which part of the copper sulphide changes into copper(I) oxide.
(ii) Write the balanced chemical equation for the next step, in which the copper(I) oxide reacts with the remaining copper sulphide to give copper metal.
(iii) Zinc oxide has to be heated with carbon to obtain zinc, but copper is obtained from its ore by heating alone. Explain this difference using the activity series.
**OR**
B. The iron grill of an old house in Satara, left unpainted for many years, has a brown, flaky coating on it, while a galvanised iron bucket and a stainless steel kitchen sink in the same house still look shiny.
(i) Name the brown, flaky substance and state the two conditions needed for it to form.
(ii) What is galvanisation? A galvanised article remains protected from rusting even when its coating gets scratched. Why?
(iii) Stainless steel is an alloy of iron. Name the two other metals mixed with iron to make it, and state why stainless steel is preferred over pure iron for a kitchen sink.

27 Fishermen at a lake near an industrial town found many dead fish in the lake after the first heavy rains of the monsoon. Students tested the lake water and found its pH to be 4.8, while the water of a lake far away from the town had a pH of 7.2.
(a) What is meant by acid rain? Why is it harmful to the fish in the lake?
(b) Why did the students use a universal indicator and not litmus paper to test the lake water?
(c) The marble (calcium carbonate) steps of a temple near the town have become rough and pitted. Write the balanced chemical equation for the reaction of calcium carbonate with dilute nitric acid present in the rain water, and name the gas given off.

**Q.28** Case-based question. (4 marks) **[4]**

28 In a school laboratory in Kolhapur, students took 10 mL of distilled water in test tube X and 10 mL of water from a village well in test tube Y. They added five drops of the same soap solution to each and shook both tubes for the same time. Tube X had a 4 cm high column of foam, while tube Y had very little foam and a white, curdy solid floating in it.

(A) Which water sample is hard? Name the ions that make water hard. (1)

(B) A soap molecule has two ends with different properties. Which end dissolves in water, and which end dissolves in oil? (1)

**Attempt either sub-part C or D.**

(C) The students have three more samples of well water, P, Q and R, and want to find out which is the hardest using only the soap solution. Describe how they should carry out the test so that the comparison is fair, and how they will decide which sample is the hardest. (2)

**OR**

(D) The students boiled some of the well water with a little washing soda, let the solid formed settle, and repeated the soap test with the clear water. What change will they observe compared with tube Y? Explain. (2)

**Q.29** Long answer question. (5 marks) **[5]**

29 **Attempt either option A or B.**

A.

I. A student heated some brown copper powder in a china dish; it slowly turned black. She then passed hydrogen gas over the heated black substance, and it turned brown again.

(a) Write the balanced chemical equations for both these changes. (1)

(b) In the second change, which substance is oxidised and which is reduced? Give a reason for each. (1)

(c) The black substance also dissolves in dilute hydrochloric acid to give a blue-green solution. Write the balanced chemical equation for this reaction. What does it show about the nature of metal oxides? (1)

II. A little white silver chloride was spread on a watch glass and kept in sunlight. After some time it turned grey.

(a) Write the balanced chemical equation for this change and name the type of reaction. (1)

(b) Give one practical use of such reactions. (1)

**OR**

B.

I. Blue crystals of a salt X were heated in a dry boiling tube. Drops of water collected near the mouth of the tube and the crystals turned into a white powder.

(a) Name X and write the chemical formula of its blue crystals. Where does the water come from, although the crystals looked dry? (1)

(b) After cooling, a few drops of water were added to the white powder. What will be observed? (1)

(c) Name one other salt that contains water of crystallisation, and write its formula showing the number of water molecules. (1)

II. (a) The municipal water works of a town adds bleaching powder to drinking water. Why is it added? Write the chemical equation for the manufacture of bleaching powder. (1)

(b) Give two other uses of bleaching powder. (1)

**SECTION C – PHYSICS (Q.30 to Q.31)** Multiple choice questions. Select the correct option. (1 mark each) **[2]**

**30** A glass block (refractive index 1.52) is kept at the bottom of an aquarium filled with water (refractive index 1.33). A ray of light travelling in the water strikes the top surface of the glass block obliquely. On entering the glass, the ray:

(A) speeds up and bends away from the normal

(B) slows down and bends away from the normal

(C) passes straight through without any change in speed

(D) slows down and bends towards the normal

**31** Which one of the following changes will **NOT** increase the strength of the magnetic field at a point near a long straight wire carrying a current?

(A) Increasing the current in the wire

(B) Bringing the point closer to the wire

(C) Reversing the direction of the current in the wire

(D) Increasing the current and also bringing the point closer to the wire

**Q.32** Assertion–Reason. Each question has two statements – Assertion (A) and Reason (R). Select the appropriate option (A), (B), (C) or (D) given below the question. (1 mark) **[1]**

**32** **Assertion (A):** An object placed between the optical centre and the principal focus of a convex lens forms a real and inverted image.

**Reason (R):** For an object placed between the optical centre and the principal focus of a convex lens, the magnification is positive and greater than 1.

(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.

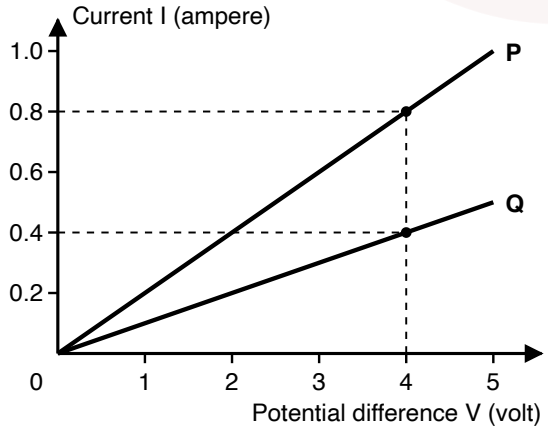
(D) A is false but R is true.

**Q.33 – Q.34** Answer the following questions. (2 marks each) **[4]**

**33** The graph shows how the current I through two wires P and Q changes with the potential difference V applied across them. Both wires are made of the same material and have the same length. (For P, I = 0.8 A at V = 4 V; for Q, I = 0.4 A at V = 4 V.)

(a) Find the resistance of each wire.

(b) Which of the two wires is thicker? Give a reason.



34 **Attempt either option A or B.**

A. Two resistors of 5 Ω and 20 Ω are available, along with a 10 V battery of negligible resistance.

I. The two resistors are connected in parallel across the battery. Find the power used in each resistor.

II. The same resistors are now connected in series across the same battery. Find the power used in each resistor. Which resistor produces more heat in this arrangement?

**OR**

B. A circular coil of 10 turns carries a current. A small compass needle placed at the centre of the coil gets deflected.

I. How will the magnetic field at the centre of the coil change if (a) the number of turns is increased to 30, keeping the current the same, and (b) the current is halved, keeping the number of turns the same?

II. Near the wire, the magnetic field lines of a circular coil are concentric circles, but at the centre of the coil they appear as almost straight lines. Explain why.

**Q.35 – Q.37** Answer the following questions. (3 marks each) **[9]**

35 For a science exhibition, Omkar wants to use a convex lens of focal length 12 cm to throw a sharp image of a glowing LED, 1.5 cm high, on a white screen. He wants the image to be 3 times as tall as the LED.

(a) At what distance from the lens should he place the LED?

(b) At what distance from the lens should he place the screen?

(c) Find the height of the image and state its nature.

36 On a winter morning, Ira placed a glass prism on a sunny windowsill and saw a band of colours on the opposite wall.

(a) What is this band of colours called? Ira noticed that the band was much wider on the far wall than on a notebook held close to the prism. Explain why.

(b) Ira then placed a second, identical prism in an inverted position close to the first, so that the band of colours passed through it. What will she see on the wall now? What does this show about sunlight?

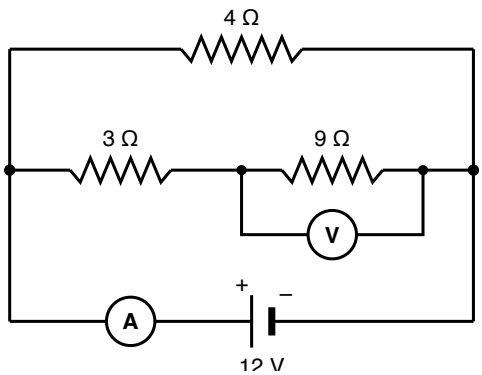
(c) Later that evening, after a rain shower, she saw a rainbow. In which direction with respect to the Sun must she look to see it, and what acts like the tiny prisms that form it?

37 In the circuit shown, a 12 V battery is connected through an ammeter A to two branches in parallel: one branch has a 4 Ω resistor, and the other has a 3 Ω and a 9 Ω resistor in series. A voltmeter V is connected across the 9 Ω resistor. Neglect the resistance of the battery, the ammeter and the connecting wires, and assume that the voltmeter draws no current.

(a) Find the equivalent resistance of the circuit.

(b) Find the reading of the ammeter and the current in each branch.

(c) Find the reading of the voltmeter.



**Q.38** Case-based question. (4 marks) **[4]**

**38** The science club of a school in Solapur made a solar cooker. They lined the inside of a large bowl-shaped dish with a shiny reflecting sheet, so that the dish works as a concave mirror of radius of curvature 1.2 m. They point the dish towards the Sun and place a cooking pot in front of it.

(A) At what distance from the dish should the cooking pot be placed? Why? (1)

(B) A student suggests making the cooker with a convex mirror of the same size instead. Would it work? Give a reason. (1)

**Attempt either sub-part C or D.**

(C) In the evening, a student placed a candle flame 0.75 m in front of the dish. Using the mirror formula, find the position of the image of the flame and its magnification, and state the nature of the image. (2)

**OR**

(D) Draw a ray diagram to show the formation of the image of a candle flame placed between the centre of curvature C and the principal focus F of the dish. State the position and nature of the image. (2)

**Q.39** Long answer question. Attempt either option (A) or (B). (5 marks) **[5]**

**(A)** A company in Shimla is designing an electric room heater that should consume 1210 W when connected to the 220 V supply.

I. Calculate the resistance of the heating element and the current it draws. (1)

II. The element is to be made of nichrome wire of cross-sectional area 0.25 $mm^2$. The resistivity of nichrome is $1.0 \times 10^{-6}$ Ω m. Calculate the length of wire needed. (2)

III. For a larger room, the company wants a 2420 W heater for the same 220 V supply, made from the same nichrome wire of cross-sectional area 0.25 $mm^2$. What length of wire will be needed? (1)

IV. On winter evenings the supply voltage sometimes falls to 200 V. Assuming the resistance of the element does not change, find the power of the heater at this voltage. (1)

**OR**

**(B)** I. A thick copper wire is passed vertically through the centre of a horizontal sheet of cardboard, and a steady current is passed **upward** through the wire. Iron filings sprinkled on the cardboard arrange themselves in a pattern when the cardboard is gently tapped. Describe the pattern, and state the direction of the magnetic field lines as seen from above. Name the rule you used. (1)

II. Two small compasses are placed on the cardboard: one 3 cm due **east** of the wire and the other 3 cm due **north** of the wire. Assuming that the Earth's magnetic field is negligible compared with the field of the wire, in which direction will the north pole of each compass needle point? Explain. (2)

III. The same wire, still carrying the current vertically upward, is now placed between the poles of a strong horseshoe magnet so that the magnetic field is horizontal and directed from **west to east**. In which direction will the wire be pushed? Name the rule you used and show how you applied it. (2)

**All the best for your exam!**