CBSE Class 10 Science: Sample Paper 1

Based on NCERT · the board's 2024 to 2026 pattern | Time: 3 hours · **Maximum marks: 80**

1. All questions are compulsory. Internal choice is given in some questions; attempt one of the alternatives.
2. Section A has 20 objective questions of 1 mark each: multiple-choice and assertion-reason.
3. Section B has very short answer questions of 2 marks; Section C short answer questions of 3 marks; Section D long answer questions of 5 marks; Section E case-based questions of 4 marks.
4. Wherever necessary, draw neat, labelled diagrams. Calculators are not allowed.
5. For the assertion-reason questions, choose: (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.

Section A (20 × 1 mark)

1. The image that the eye lens forms on the retina is [1]

(a) virtual and erect
(b) real and inverted
(c) real and erect
(d) virtual and inverted

2. A stage technician wants to dim a lamp smoothly without changing the battery. In series with the lamp he should connect [1]

(a) a voltmeter
(b) a rheostat
(c) an ammeter
(d) a second battery

3. Which product is formed both when yeast breaks down pyruvate without oxygen and when pyruvate is broken down in the mitochondria using oxygen? [1]

(a) Ethanol
(b) Water
(c) Carbon dioxide
(d) Lactic acid

4. At a cable factory in Renukoot, copper rods are pulled through smaller and smaller holes until they become fine wires. The property of copper that makes this possible is [1]

(a) ductility
(b) malleability
(c) sonorousness
(d) lustre

5. The chemical name of baking soda is [1]

(a) sodium carbonate
(b) sodium chloride
(c) sodium hydroxide
(d) sodium hydrogencarbonate

6. Benzene and cyclohexane each contain a ring of six carbon atoms. Which statement is correct? [1]

(a) Both are saturated.
(b) Benzene, C_6H_6, is unsaturated; cyclohexane, C_6H_{12}, is saturated.
(c) Benzene is saturated; cyclohexane is unsaturated.
(d) Neither is a hydrocarbon.

7. Assertion (A): Danger signal lights on railway tracks are red. Reason (R): Red light is scattered the least by fog or smoke. [1]

(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.

8. In the copper wire of a torch circuit, electrons drift from the negative terminal of the cell, through the bulb, towards the positive terminal. By convention, the electric current in that wire [1]

(a) flows only inside the cell
(b) flows the same way as the electrons
(c) flows from the positive terminal through the bulb to the negative terminal
(d) has no fixed direction

9. Assertion (A): Most of the power consumed by the filament of a lit bulb appears as heat, not light. Reason (R): Tungsten is used for filaments because it melts only at 3380 °C. [1]

(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. Meenal wants to see the complete image of a tall building behind her in a small hand mirror. She should use [1]

(a) a plane mirror
(b) a concave mirror held at arm's length
(c) a concave mirror held close to her eye
(d) a convex mirror

11. Assertion (A): A Hibiscus flower is bisexual. Reason (R): The stamen produces yellowish pollen grains. [1]

(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.

12. In a farm food chain paddy → rat → snake → eagle, the tertiary consumer is the [1]

(a) eagle
(b) snake
(c) rat
(d) paddy

13. A flower grower wants thousands of disease-free plants of one prized ornamental variety, all from a single parent plant. The method best suited is [1]

(a) growing them from seeds
(b) cross-pollination
(c) tissue culture
(d) layering a single branch

14. Milk of magnesia, taken to relieve acidity, is [1]

(a) $Mg(OH)_2$
(b) MgO
(c) $MgCO_3$
(d) $MgSO_4$

15. In a single neuron, an electrical impulse travels in the order [1]

(a) axon → cell body → dendrite
(b) dendrite → axon → cell body
(c) cell body → dendrite → axon
(d) dendrite → cell body → axon

16. Assertion (A): Baking soda is used as an antacid. Reason (R): Baking soda is produced using sodium chloride as one of its raw materials. [1]

(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.

17. Propane, a fuel gas, burns in oxygen: $C_3H_8 + x\ O_2 \rightarrow 3CO_2 + 4H_2O$. For the equation to be balanced, x must be [1]

(a) 3
(b) 10
(c) 7
(d) 5

18. A compass needle is a small bar magnet. The end of the needle that settles pointing towards the north is called its [1]

(a) unmagnetised end
(b) south pole
(c) neutral point
(d) north-seeking or north pole

19. A gardener lays a fleshy Bryophyllum leaf on moist soil. A few weeks later small plants appear. They grew from [1]

(a) buds in the notches along the leaf margin
(b) the leaf stalk
(c) seeds in the leaf
(d) spores on the leaf surface

20. Meena and Arjun have a son. The chromosome that made the child a boy came from [1]

(a) Meena, who gave an X
(b) Arjun, who gave a Y
(c) Arjun, who gave an X
(d) Meena, who gave a Y

Section B (6 × 2 marks)

21. A few millilitres of ethyl ethanoate are warmed with sodium hydroxide solution in a test tube. After some time the fruity smell has gone. Explain this with an equation, and name the type of reaction. [2]

Or *Name the products formed when an ester is heated with sodium hydroxide. Write the equation for this reaction taking ethyl ethanoate as the ester, and state the use of such a reaction in industry.*

22. The leaf cells of a plant species have 20 chromosomes. How many chromosomes will (i) a male germ-cell of this plant and (ii) a zygote of the species carry? Give the reason for each. [2]

23. To locate the image formed by a convex mirror, a student draws two rays from the top of the object. Name two such rays and state the path of each after reflection. [2]

24. Neha's flat has a plastic-bodied mixer, a table fan, a toaster and an LED bulb. (a) Which of these must have their bodies joined to the green wire, and why those? (b) Where does the green wire end outside the house? [2]

25. A blacksmith finds that a rod of pure iron bends and stretches easily when hot. (a) What can be mixed with the iron to make it hard and strong? (b) Name the alloy used for kitchen sinks that does not rust, and its added metals. [2]

26. Name the instrument used to measure blood pressure. What causes high blood pressure (hypertension)? [2]

Section C (7 × 3 marks)

27. A neurologist examines three patients after head injuries. P can think and speak clearly but sways while walking and can no longer ride a bicycle. Q cannot control his salivation and vomits often. R has healthy nasal passages but can no longer recognise smells. Name the part of the brain likely to be damaged in each, giving a reason. [3]

Or *Three patients are examined after head injuries. L can no longer pick up a pencil neatly or walk in a straight line. M's blood pressure swings without control. N's ears are healthy but sounds are no longer recognised. Name the part of the brain likely to be damaged in each, giving a reason.*

28. Two wires A and B are of the same material and the same length. A carries 0.25 A when 3.0 V is applied across it; B carries 1.5 A when 6.0 V is applied across it. (i) Describe the V–I graph of each wire (V plotted against I) and say which is steeper. (ii) Which wire is thicker, and how do their areas of cross-section compare? (iii) Find the current in each wire when 9 V is applied across it. [3]

29. A jar of homemade mathri, fried in oil, is left open in a cupboard for a few weeks and begins to smell and taste unpleasant. (a) Name this condition and the chemical process behind it. (b) State two ways in which a manufacturer of packaged snacks can prevent it. [3]

30. A fish has only a two-chambered heart, yet oxygenated and de-oxygenated blood never mix in it. Explain why. How many times does blood pass through the heart in one cycle in a fish and in a human being? [3]

31. A tailor is prescribed spectacles of power +3.2 D for close work; with them he sees his stitching clearly at 25 cm. Find the focal length of the lens and the nearest distance at which he can see clearly without the spectacles, and name the lens. [3]

32. Three gas jars hold ethane, ethene and ethyne. (a) Write the structural formula of each. (b) Which of the three is expected to burn in air with the cleanest flame, and why? (c) Write the name and structure of the compound formed when ethyne adds two molecules of hydrogen over a nickel catalyst. [3]

33. At a scrap yard in Delhi, old refrigerators are broken up and a gas escapes from their cooling pipes. (a) Name the class of chemical likely to be in old refrigerators, and one other use of it. (b) What change in the atmosphere has it been linked to? (c) Ozone is also present in the air the scrap-yard workers breathe. Why is that no benefit to them? [3]

Section D (3 × 5 marks)

34. A drop of lemon juice falls on Meera's tongue and she makes a face. (a) Which receptors detect the sourness, and where in a nerve cell are receptors found? (b) Describe how the information travels through the first neuron. (c) The sour taste lasts for minutes, yet a neuron cannot keep sending impulses without a pause. Why not, and what second means of communication does the body therefore also use? [5]

Or *The lunch bell rings and Sameer, sitting near the canteen, hears it and smells hot samosas at the same moment. (a) Where are the receptors for the bell's sound found, what are receptors, and which receptors pick up the samosas? (b) Describe how the information from the bell becomes an impulse and travels through the first neuron. (c) The bell rings for a full minute, yet a neuron cannot keep sending impulses without a pause. Why not, and what second means of communication does the body therefore also use?*

35. At a science exhibition, a thick straight copper rod stands vertically through a hole in a horizontal glass sheet, and a steady current flows down the rod. (a) Describe the shape of the magnetic field lines on the glass sheet and the plane they lie in. (b) Seen from above, do the lines go clockwise or anticlockwise? Name the rule you use. (c) Compare the field at 3 cm and at 6 cm from the rod. (d) State the effect on the field at a point of increasing the current, and of reversing it. [5]

Or *A long straight wire is stretched horizontally across a laboratory and passes at right angles through a vertical sheet of card. Sunita stands facing the card, and the current in the wire flows towards her. (a) Describe the shape of the field lines on the card and where their centre lies. (b) To Sunita, do the lines go clockwise or anticlockwise? Name the rule. (c) A compass on the card is moved from 2 cm to 8 cm from the wire. How does the field at the compass change? (d) State the effect on the field at a point of halving the current, and of reversing it.*

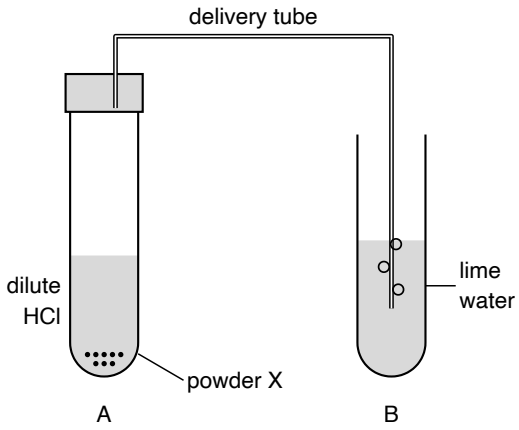
36. In a school lab Arjun uses an electrolysis kit with two platinum electrodes, each under a graduated tube filled with water to which a few drops of dilute sulphuric acid have been added. Electrode X is joined to the negative terminal of a battery and electrode Y to the positive terminal. (a) Write the balanced equation for the change, with the condition over the arrow, and state which tube, X or Y, collects hydrogen. Give a reason. (2) (b) Why did Arjun add a few drops of dilute sulphuric acid to the water? (1) (c) If 0.5 g of hydrogen is collected, what mass of oxygen is collected with it? (1) (d) Is this reaction exothermic or endothermic? Give a reason. (1) [5]

Or *Sana electrolyses acidulated water to make the two gases that water is built from. (a) Name the gas collected over the positive electrode, and write the balanced equation for the overall change with state symbols and the condition over the arrow. (2) (b) Sana first tried distilled water with nothing added and saw almost no bubbles. Explain. (1) (c) Sana says the two gases form in a 2 : 1 ratio by mass, just as they do by volume. Correct her, giving the mass ratio. (1) (d) Name the form of energy that brings about this decomposition, and state whether the reaction absorbs or releases energy. (1)*

Section E (3 × 4 marks)

37. Read the passage and answer the questions that follow. [4]

Rohan sets up the apparatus shown. Test tube A holds a white powder X, to which he adds dilute hydrochloric acid. Brisk effervescence follows, and the gas formed is led through the delivery tube into the clear solution in test tube B. The solution in B soon turns milky. Rohan lets the gas bubble through B for several more minutes and finds that the milkiness slowly disappears.



(a) The gas that turns the solution in test tube B milky is [1]

(a) hydrogen
(b) chlorine
(c) carbon dioxide
(d) oxygen

(b) The milkiness disappears when the gas is passed for a long time because [1]

(a) the calcium carbonate dissolves as soluble calcium hydrogencarbonate
(b) the calcium carbonate changes back to calcium hydroxide
(c) the gas carries the precipitate out of the tube
(d) the lime water boils away

(c) X is a sodium compound that is also used, with a mild edible acid, to make cakes rise. Identify X and write the balanced equation for its reaction with dilute hydrochloric acid. [2]

Or *Instead, X is marble, a naturally occurring form of a calcium compound, and the acid is dilute nitric acid. Identify X and write the balanced equation for the reaction.*

38. Read the passage and answer the questions that follow. [4]

An auxiliary nurse midwife in a village in Odisha holds a counselling session for newly married couples. She shows a model with a small copper-T placed inside it, a packet of condoms, and a chart of the male and female reproductive tracts on which two tubes are marked with a cross. She explains that each method prevents pregnancy in a different way, that some methods have side effects, and that one of them also gives some protection against infections passed during sex.

(a) Of the methods shown, the one that also helps reduce the spread of sexually transmitted infections is the [1]

(a) copper-T
(b) condom
(c) blocking of the vas deferens
(d) blocking of the fallopian tube

(b) Where is the copper-T placed, and what side effect can it cause? [1]

(c) The two crossed tubes on the chart are the vas deferens and the fallopian tube. Explain how blocking each prevents pregnancy, and state the risk of the method. [2]

Or *Compare the condom and the copper-T: where each is used, and how the condom prevents pregnancy.*

39. Read the passage and answer the questions that follow. [4]

The Nair family in Thrissur want to understand their electricity bill. For one typical day they note the power rating of each appliance in their flat and how long it runs. The supply is 230 V, and the electricity board charges ₹6 for each unit of energy. Their brother says the iron must use the most energy because it has the highest rating; their mother thinks the fan, which runs most of the day, may use more.

Appliance	Power (W)	Use per day (h)
Ceiling fan	75	8
LED television	100	4
Mixer	500	0.4
Electric iron	1000	0.5

(a) Which appliance consumes the most electrical energy in a day? [1]

(a) ceiling fan
(b) electric iron
(c) mixer
(d) LED television

(b) The total electrical energy consumed by the four appliances in a day is [1]

(a) 6.12 MJ
(b) 1.7 MJ
(c) 0.47 MJ
(d) 61.2 MJ

(c) Find the family's bill for these appliances for 30 such days. [2]

Or *Find the current drawn by the iron and choose its fuse from 2 A, 5 A and 10 A.*