# Zyllabo

# Class 10 Science – SET 5

**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 the choices in such questions.
3. Section A (Biology) has 16 questions carrying 30 marks, Section B (Chemistry) has 13 questions carrying 25 marks and Section C (Physics) has 10 questions carrying 25 marks.
4. Questions 1 to 7 (Section A), 17 to 23 (Section B) and 30 to 31 (Section C) are multiple choice questions of 1 mark each. Assertion–Reason questions are 1 mark each.
5. Section A: Q.10 to 12 carry 2 marks, Q.13 and 14 carry 3 marks. Section B: Q.25 carries 2 marks, Q.26 and 27 carry 3 marks. Section C: Q.33 and 34 carry 2 marks, Q.35 to 37 carry 3 marks.
6. Each case-based question carries 4 marks and each long answer question carries 5 marks.
7. Draw neat, labelled diagrams wherever required.

## Section A – Biology

*Questions 1 to 7 are multiple choice, 8 and 9 are Assertion–Reason (1 mark each), 10 to 12 carry 2 marks, 13 and 14 carry 3 marks, 15 is a case-based question (4 marks) and 16 is a long answer (5 marks). [30 marks]*

**1** Amoeba takes in food by **[1]**

(a) a mouth and a food pipe
(b) absorbing it through the cell wall
(c) engulfing it with finger-like extensions called pseudopodia
(d) using root-like structures

**2** Which of the following substances is completely reabsorbed from the filtrate in the nephron under normal conditions? **[1]**

(a) Glucose
(b) Urea
(c) Uric acid
(d) Excess salts

**3** Which of the following correctly matches a hormone, its gland and its function? **[1]**

(a) Insulin – pituitary – regulates blood sugar
(b) Thyroxine – thyroid – regulates metabolism
(c) Adrenaline – pancreas – prepares the body for emergency
(d) Growth hormone – thyroid – controls growth

**4** A tall pea plant of unknown genotype is crossed with a dwarf pea plant. Half of the progeny are dwarf. The genotype of the tall parent is **[1]**

(a) TT
(b) tt
(c) either TT or Tt
(d) Tt

**5** Which of the following is an advantage of vegetative propagation? **[1]**

(a) Plants show a lot of variation
(b) Plants are very different from the parent
(c) It is useful only for plants that produce seeds
(d) Plants raised by it bear flowers and fruits earlier than those raised from seeds

**6** Oral contraceptive pills prevent pregnancy by **[1]**

(a) blocking the fallopian tubes
(b) killing the sperms in the vagina
(c) preventing the release of the egg from the ovary
(d) stopping the formation of sperms

**7** In the food chain Grass → Insect → Frog → Snake, the secondary consumer is the **[1]**

(a) insect
(b) frog
(c) snake
(d) grass

**8** Assertion (A): Transpiration helps in cooling the plant. **[1]**
Reason (R): The evaporation of water from the leaves takes away heat from the leaf surface.
(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): Pollination and fertilisation are the same process. **[1]**
Reason (R): Pollination is the transfer of pollen from the anther to the stigma, whereas fertilisation is the fusion of the male and the female gametes.
(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** State the functions of (a) hydrochloric acid and (b) mucus in the human stomach. **[2]**

**OR**

Why is the small intestine in herbivores longer than in carnivores?

**11** Name the hormone secreted by (a) the testes in males and (b) the ovaries in females. State one function of each. **[2]**

**12** How is ozone formed in the upper atmosphere? Why is the depletion of the ozone layer harmful? **[2]**

**OR**

What is a food web? How is it different from a food chain?

**13** Mendel crossed pure tall and pure dwarf pea plants. State his observations in the $F_1$ and $F_2$ generations and the conclusion he drew. **[3]**

**OR**

Why do the offspring of sexually reproducing organisms show variation? Write any two advantages of variation to a species.

**14** Differentiate between arteries and veins on the basis of any three points. **[3]**

**OR**

Describe the working of an artificial kidney (haemodialysis) in brief.

**15** **Case-based question** **[4]**

> A student placed a potted plant near a window and observed after a few days that its shoot had bent towards the window. In another activity she kept germinating pea seeds on a moist cotton pad in a closed box with their roots pointing sideways. After some days the roots had bent downwards and the shoots had bent upwards.

(i) Name the type of movement shown by the shoot bending towards the window. **[1]**

(ii) Name the plant hormone responsible for this bending. **[1]**

(iii) Name the type of movement shown by the roots bending downwards. **[1]**

(iv) What is the growth of the pollen tube towards the ovule called? **[1]**

**16** (a) What are dominant and recessive traits? **[5]**

(b) A pure tall pea plant (TT) is crossed with a pure dwarf pea plant (tt). Using a Punnett square, show the $F_2$ generation obtained on self-pollination of the $F_1$ plants.

(c) Write the phenotypic and genotypic ratios of the $F_2$ generation.

**OR**

Describe the structure of the human brain. Write the functions of its three main parts.

## Section B – Chemistry

*Questions 17 to 23 are multiple choice and 24 is Assertion–Reason (1 mark each), 25 carries 2 marks, 26 and 27 carry 3 marks, 28 is a case-based question (4 marks) and 29 is a long answer (5 marks). [25 marks]*

**17** A few drops of phenolphthalein are added to sodium hydroxide solution and dilute HCl is added drop by drop until it is in excess. The colour changes from **[1]**

(a) pink to colourless
(b) colourless to pink
(c) pink to blue
(d) colourless to yellow

**18** Which of the following is NOT a chemical change? **[1]**

(a) Rusting of iron
(b) Melting of ice
(c) Burning of magnesium ribbon
(d) Curdling of milk

**19** When carbon dioxide is passed through lime water, it turns milky due to the formation of **[1]**

(a) calcium hydroxide
(b) calcium oxide
(c) calcium chloride
(d) calcium carbonate

**20** Which of the following is used as an antacid? **[1]**

(a) $Mg(OH)_2$
(b) NaOH
(c) HCl
(d) $CaOCl_2$

**21** An element X forms an oxide $X_2O$ that dissolves in water to give a solution that turns red litmus blue. X is most likely **[1]**

(a) sulphur
(b) carbon
(c) sodium
(d) phosphorus

**22** Iron nails are placed in copper sulphate solution. After some time the colour of the solution changes from **[1]**

(a) blue to light green
(b) blue to colourless
(c) green to blue
(d) colourless to blue

**23** The functional group present in a ketone is **[1]**

(a) –OH
(b) –CHO
(c) –COOH
(d) > C = O

**24** Assertion (A): All carbon compounds burn with a sooty flame. **[1]**
Reason (R): Compounds with a high percentage of carbon, such as unsaturated hydrocarbons, burn with a sooty flame.
(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** Balance the equation $Fe + H_2O \rightarrow Fe_3O_4 + H_2$ and name the type of reaction. **[2]**

**OR**

In the electrolysis of water, why is the volume of the gas collected at one electrode double that at the other? Write the equation.

**26** Write the chemical name and formula of bleaching powder. How is it prepared? State two uses of it. **[3]**

**27** (a) What is an alloy? (b) Name the constituents of brass and solder. (c) Why is solder used for welding electrical wires? **[3]**

**OR**

Why is sodium stored under kerosene oil? Write the equation for the reaction of sodium with water.

**28** **Case-based question** **[4]**

Four carbon compounds have the following molecular formulae: A: $C_2H_6$, B: $C_2H_4$, C: $C_2H_2$ and D: $C_2H_5OH$.

(i) Which of the compounds are unsaturated? **[1]**
(ii) Name the functional group present in D. **[1]**
(iii) Write the equation for the addition of hydrogen to B in the presence of nickel. **[1]**
(iv) Write the general formula of the homologous series to which C belongs. **[1]**

**29** (a) Draw the electron dot structure of a chlorine molecule (atomic number of chlorine = 17). **[5]**
(b) Give two reasons why covalent compounds generally have low melting and boiling points.
(c) Name a covalent compound that contains a double bond.

**OR**

(a) Write the chemical equation for the dehydration of ethanol using concentrated sulphuric acid.
(b) What is denatured alcohol? Why is ethanol denatured?
(c) Write two uses of ethanoic acid.

## Section C – Physics

*Questions 30 and 31 are multiple choice and 32 is Assertion–Reason (1 mark each), 33 and 34 carry 2 marks, 35 to 37 carry 3 marks, 38 is a case-based question (4 marks) and 39 is a long answer (5 marks). [25 marks]*

**30** An object is placed at the centre of curvature of a concave mirror. The image formed is **[1]**

(a) virtual and erect, behind the mirror

(b) real, inverted and of the same size, at the centre of curvature

(c) real, inverted and magnified, beyond the centre of curvature

(d) real, inverted and diminished, between F and C

**31** One kilowatt-hour (1 kWh) is equal to **[1]**

(a) $3.6 \times 10^3$ J

(b) $3.6 \times 10^5$ J

(c) $3.6 \times 10^6$ J

(d) $3.6 \times 10^8$ J

**32** Assertion (A): A person suffering from hypermetropia is advised to use a convex lens. **[1]**
Reason (R): In hypermetropia the image of a nearby object is formed behind the retina and a converging lens is needed to bring it on the retina.

(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** Write the mirror formula. Define the linear magnification produced by a mirror. **[2]**

**OR**

Define refraction of light. Why does a coin placed at the bottom of a beaker of water appear raised?

**34** How is an ammeter connected in a circuit? How is a voltmeter connected? Give a reason for each. **[2]**

**OR**

Define electric current. Write its SI unit and the relation between the unit and charge.

**35** A person cannot see nearby objects clearly; her near point is 100 cm. Name the defect and calculate the power of the lens required so that she can read a book kept at 25 cm. **[3]**

**36** A 12 Ω and a 4 Ω resistor are connected in parallel and this combination is connected in series with a 5 Ω resistor and a 12 V battery. Calculate (a) the equivalent resistance of the parallel combination, (b) the total resistance of the circuit and (c) the current drawn from the battery. **[3]**

**37** Describe an activity to show that a current-carrying conductor placed in a magnetic field experiences a force. **[3]**

**38** **Case-based question** **[4]**

> The human eye is like a camera. Light enters through the cornea and the pupil, and the eye lens forms a real, inverted image on the retina. The ciliary muscles change the focal length of the lens so that we can see objects at different distances. A normal eye can see objects clearly if they are placed between a minimum distance and infinity.

(i) What is the near point of a normal human eye? **[1]**

(ii) Which part of the eye controls the amount of light entering the eye? **[1]**

(iii) Name the process by which the eye lens adjusts its focal length. **[1]**

(iv) What is the function of the retina? **[1]**

**39** (a) Draw a circuit diagram to study the relation between the potential difference across a resistor and the current through it. **[5]**
(b) State Ohm's law.
(c) What does the slope of the V–I graph of a resistor represent?
(d) If the potential difference across a resistor is 6 V and the current is 0.5 A, find its resistance.

**OR**

(a) Define the resistivity of a material and state its SI unit.
(b) State the factors on which the resistance of a conductor depends.
(c) Why is nichrome used in heating elements?

**— End of Paper —** Questions? support@zyllabo.com

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