Model Solutions

CBSE Class 10 Science – SET 5

The paper solved the way a student should write it in the answer book: every step, every keyword and every labelled diagram that earns marks.

How to read this script

Black ink is the written answer, as in the board answer book.

Pencil is used for every diagram, neatly labelled.

[2] at the right edge shows the marks for that question.

Marks are shown for every question, as in the marking scheme.

Written in a neat handwriting style to show how a model answer should look.

Always check the answer against your textbook. Questions: support@zyllabo.com

Section A – Biology

Ans 1. Ans. (c) engulfing it with finger-like extensions called pseudopodia [1]

Amoeba surrounds the food particle with its pseudopodia and forms a food vacuole where digestion takes place.

Ans 2. Ans. (a) Glucose [1]

All the glucose of the filtrate is selectively reabsorbed back into the blood.

Ans 3. Ans. (b) Thyroxine – thyroid – regulates metabolism [1]

Thyroxine is secreted by the thyroid gland and regulates the metabolism of carbohydrates, proteins and fats.

Ans 4. Ans. (d) Tt [1]

Tt × tt gives 1 Tt (tall) : 1 tt (dwarf). If the parent were TT, all progeny would be tall.

Ans 5. Ans. (d) Plants raised by it bear flowers and fruits earlier than those raised from seeds [1]

Plants raised from stems, roots or leaves bear flowers and fruits earlier than plants raised from seeds.

Ans 6. Ans. (c) preventing the release of the egg from the ovary [1]

Oral pills change the hormonal balance and so prevent the release of eggs.

Ans 7. Ans. (b) frog [1]

Grass is the producer, the insect is the primary consumer and the frog (which eats the insect) is the secondary consumer.

Ans 8. Ans. (a) [1]

Loss of water vapour needs heat, which is taken from the leaf, so R explains A.

Ans 9. Ans. (d) [1]

R is true. A is false because pollination and fertilisation are different steps.

Ans 10. (a) Hydrochloric acid makes the medium acidic so that the enzyme pepsin can act, and it kills the harmful bacteria present in food. [2]

(b) Mucus protects the inner lining of the stomach from the action of the acid.

Ans 11. (a) Testosterone is secreted by the testes. It brings about changes at puberty such as the growth of facial hair and a deeper voice, and controls sperm production. [2]

(b) Oestrogen is secreted by the ovaries. It brings about changes at puberty in girls, such as breast development and the start of menstruation.

Ans 12. (A) Ultraviolet (UV) radiation splits the oxygen molecule (O_2) into free oxygen atoms. These atoms combine with an oxygen molecule to form ozone: $O_2 \rightarrow O + O$; $O + O_2 \rightarrow O_3$. [2]

Depletion of the ozone layer allows more harmful UV radiation to reach the earth, which can cause skin cancer and cataract.

Ans 13. (A) F_1 generation: all the plants were tall (the dwarf trait did not appear). [3]
F_2 generation: both tall and dwarf plants appeared in the ratio 3 tall : 1 dwarf.

Conclusion: traits are controlled by pairs of factors (genes), one from each parent. The tall trait is dominant and expresses itself even when one copy is present; the dwarf trait is recessive and appears only when both copies are recessive.

Ans 14. (A) Direction of flow: arteries carry blood away from the heart to the organs; veins carry blood from the organs back to the heart. [3]
Walls: arteries have thick, elastic walls as the blood flows under high pressure; veins have thin walls as the pressure is low.
Valves: arteries have no valves; veins have valves that prevent the

backflow of blood. (Arteries usually carry oxygenated blood, and veins deoxygenated blood, except the pulmonary artery and vein.)

Ans 15. Case-based question [4]

(i) Phototropism (a movement in response to light). [1]

(ii) Auxin. [1]

(iii) Geotropism (a movement in response to gravity). [1]

(iv) Chemotropism (a movement in response to a chemical). [1]

Ans 16. (a) A dominant trait is the one that expresses itself in a hybrid (Tt); a recessive trait is the one that is masked in a hybrid and appears only when both alleles are recessive (tt). [5]

(b) F_1 plants are all Tt. On self-pollination, each F_1 plant makes gametes T and t. Punnett square for the F_2 generation:

Gametes →	T	t
T	TT	Tt
t	Tt	tt

Phenotype 3 : 1

Genotype 1 : 2 : 1

(c) Phenotypic ratio: 3 tall : 1 dwarf. Genotypic ratio: 1 TT : 2 Tt : 1 tt.

Section B – Chemistry

Ans 17. Ans. (a) pink to colourless [1]

Phenolphthalein is pink in a base and colourless in an acid, so the colour changes from pink to colourless.

Ans 18. Ans. (b) Melting of ice [1]

Melting of ice is a physical change; no new substance is formed.

Ans 19. Ans. (d) calcium carbonate [1]

$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$; calcium carbonate is insoluble and makes lime water milky.

Ans 20. Ans. (a) $Mg(OH)_2$ [1]

Magnesium hydroxide (milk of magnesia) is a mild base that neutralises the excess acid in the stomach.

Ans 21. Ans. (c) sodium [1]

Metal oxides are basic; sodium oxide dissolves in water to give a basic solution (NaOH).

Ans 22. Ans. (a) blue to light green [1]

$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$. Blue copper sulphate changes to light green iron sulphate.

Ans 23. Ans. (d) > C = O [1]

Ketones contain the carbonyl group >C=O within the carbon chain.

Ans 24. Ans. (d) [1]

R is true. A is false because saturated hydrocarbons burn with a clean blue flame.

Ans 25. $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$ [2]

It is a displacement reaction (iron displaces hydrogen from steam).

Ans 26. Bleaching powder is calcium oxychloride, $CaOCl_2$. [3]

It is prepared by passing chlorine gas over dry slaked lime: $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$.

Uses: (i) bleaching cotton and linen in the textile industry and wood pulp in paper factories; (ii) disinfecting drinking water.

Ans 27. (a) An alloy is a homogeneous mixture of a metal with other metals or non-metals. [3]

(b) Brass is an alloy of copper and zinc. Solder is an alloy of lead and tin.

(c) Solder has a low melting point, so it melts easily and joins the wires without damaging them.

Ans 28. Case-based question [4]

(i) B (ethene) and C (ethyne), because they have a double and a triple bond between carbon atoms. [1]

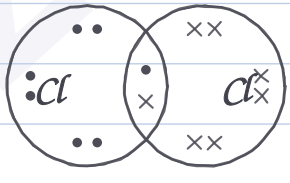
(ii) Alcohol group (–OH). [1]

(iii) $CH_2=CH_2 + H_2 \rightarrow CH_3–CH_3$ (in the presence of nickel catalyst) giving ethane. [1]

(iv) C is ethyne, an alkyne. The general formula of alkynes is CnH2n–2. [1]

Ans 29. (a) Chlorine (2,8,7) has seven electrons in its outer shell and needs one more to complete the octet. Two chlorine atoms share one pair of electrons. [5]

Electron dot structure of Cl_2:



• electron of one Cl atom

× electron of the other Cl atom

Cl_2: one shared pair, a single covalent bond

Each Cl atom (2,8,7) has 8 electrons in its outer shell.

(b) The force of attraction between the molecules of covalent compounds is weak, so only a small amount of energy is needed to break it. Covalent compounds also do not have ions, so they are poor conductors of electricity.

(c) Ethene (C_2H_4) has a double bond between the two carbon atoms.

Section C – Physics

Ans 30. Ans. (b) real, inverted and of the same size, at the centre of curvature [1]

When the object is at C, the image is at C, real, inverted and of the same size.

Ans 31. Ans. (c) 3.6×10^6 J [1]

1 KWh = 1000 W × 3600 s = 3.6×10^6 J.

Ans 32. Ans. (a) [1]

The convex lens converges the rays so that the image forms on the retina, so R explains A.

Ans 33. (A) Mirror formula: $1/v + 1/u = 1/f$, where u is the object distance, v the image distance and f the focal length. [2]

Linear magnification is the ratio of the height of the image to the height of the object: $m = h'/h = -v/u$.

Ans 34. (A) An ammeter is connected in series, because it must carry the same current as the circuit; it has a very low resistance. [2]

A voltmeter is connected in parallel across the component, because it measures the potential difference between two points; it has a very high resistance.

Ans 35. The person suffers from hypermetropia (far-sightedness). [3]

The lens must form a virtual image of the book ($u = -25$ cm) at her near point ($v = -100$ cm).

$1/f = 1/v - 1/u = -1/100 + 1/25 = 3/100$, so $f = 100/3$ cm = 0.33 m.

Power $P = 1/f = +3$ D (a convex lens).

Ans 36. (a) $1/R = 1/12 + 1/4 = (1 + 3)/12 = 1/3$, so $R = 3\ \Omega$. [3]

(b) Total resistance = 3 + 5 = 8 Ω.

(c) Current $I = V/R = 12/8 = 1.5$ A.

Ans 37. Take a small aluminium rod AB and suspend it horizontally from a stand with two connecting wires, so that it lies between the poles of a strong horseshoe magnet. Connect the rod in series with a battery, a key and a rheostat. [3]

When the key is closed, current flows through the rod and the rod gets displaced (moves). This shows that a force acts on it.

When the direction of current is reversed (or the poles of the magnet are interchanged) the rod is displaced in the opposite direction.

Ans 38. Case-based question [4]

(i) The near point is the minimum distance of clear vision, about 25 cm. [1]

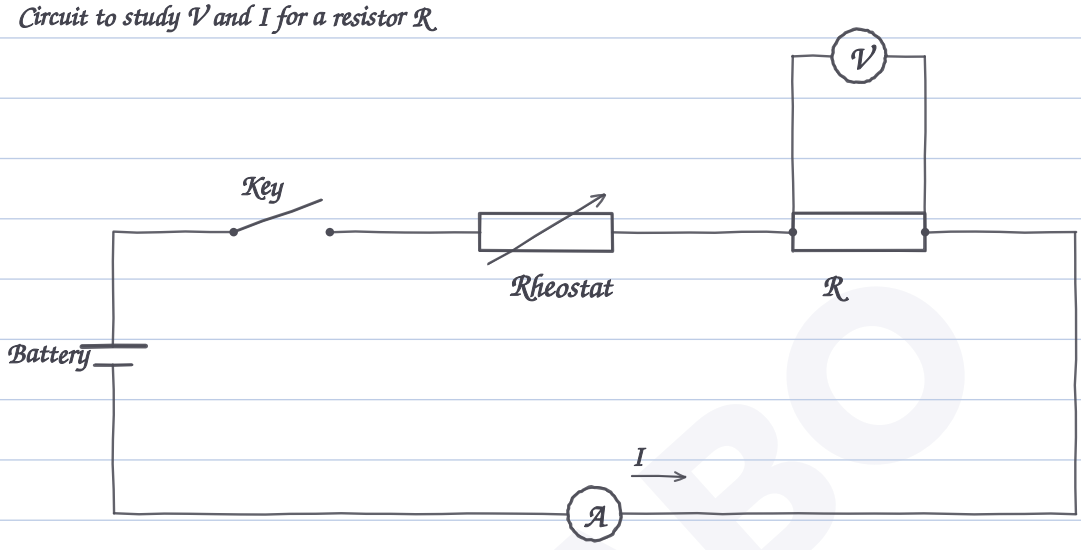
(ii) The iris, which changes the size of the pupil. [1]

(iii) Accommodation. [1]

(iv) The retina is the screen on which the image forms. Its light-sensitive cells generate electrical signals that the optic nerve carries to the brain. [1]

Ans 39. (a) Circuit diagram showing the battery, key, rheostat, ammeter (in series) and voltmeter (across the resistor): [5]

Circuit to study V and I for a resistor R



(b) Ohm's law: the current through a conductor is directly proportional to the potential difference across its ends, provided the temperature and other conditions remain the same: $V = IR$.

(c) The slope of the V–I graph (V/I) gives the resistance of the resistor.

(d) $R = V/I = 6/0.5 = 12\ \Omega$.