Answer Key Science Half Yearly Exam

Section A Biology

Q1. (A). growth hormone from pituitary gland

Q2. (c) Cerebellum

Q3. (a) BB x bb

Q4. (c) Fallopian tube

Q5. (C) hyphae and sporangium

Q6.(C) Green plants

Q7. (B) Lactic acid + Energy

Q8.A and R both true, and R explains A → (a)

Q9.A and R both true, and R explains A → (a)

Q10. It is completely wrong to say that plants do not produce any excretory products. However, plants use completely different strategies for excretion than those of the animals.They get rid of these wastes in different manner (any two): i. Oxygen, a photosynthetic waste, is removed through stomata. ii. Excess water is removed by transpiration through stomata. iii. Other metabolic wastes are either stored in dead cells, resins and gums or are removed through falling of old leaves. iv. Many waste products are stored in cellular vacuoles

Q11.

- Variations help organisms to adapt to changing environment.

- They ensure survival of species against diseases, climate changes etc.

OR

Xylem moves water and minerals obtained from the soil through roots to all other parts of the plant in a unidirectional manner// Transpiration takes place from leaf which causes a transpirational pull in the tracheids and vessels of xylem facilitating upward movement of water// roots 2 actively uptake ions from the soil, leading to difference in concentration gradient, thereby water moves into the roots to eliminate this difference/ creating a steady movement of water into root xylem.

Q12.

- Binary fission→ Nucleus divides once, produces 2 daughter cells.

- Multiple fission → Nucleus divides repeatedly before cytoplasm division, producing many daughter cells.

(1 mark each)

Q13.

Double fertilisation in angiosperms

- One male gamete fuses with egg cell → Zygote (syngamy).

- Other male gamete fuses with two polar nuclei → Endosperm (triple fusion).

- Thus, two fertilisations happen in one embryo sac.

Neat diagram showing ovule, egg cell, polar nuclei etc.

(2 marks explanation + 1 mark diagram)

Q14.

(1) Ventricles pump blood to whole body → need stronger force → thicker walls.

(2) Blind spot has no photoreceptor cells (rods or cones) → no vision formed there.

(1½ + 1½ = 3 marks)

Q15

Diagram of human female reproductive system with any 4 labels

- Ovary, Oviduct (Fallopian tube), Uterus, Cervix, Vagina.

(2 marks diagram + 2 marks for correct labels = 4)

OR

A. Eggs are rich in proteins. The digestion of proteins is initiated in the stomach. Gastric glands present in the wall of the stomach release hydrochloric acid, a protein digesting enzyme called pepsin and mucus. The hydrochloric acid creates an acidic medium which facilitates the action of enzyme pepsin.

B. Eggs contain fats. Bile juice from the liver breaks down large fat globules into smaller ones for increasing the efficiency of the enzymes and making the medium alkaline. Emulsified fats are digested by lipase secreted by pancreas.

C. Sweet potatoes are rich in starch. The saliva secreted by salivary glands present in buccal cavity contain an enzyme called salivary amylase that breaks down starch which is a complex molecule to give sugar.

D. Small Intestine will have a maximum amount of digested food as the process of digestion is completed in the small intestine.

Q16 (5 marks)

(a) Monohybrid Cross (Mendel):

- Cross between Tall (TT) × Dwarf (tt).

- F_1 generation → all Tall (Tt).

- F_2 generation (Tt × Tt) → ratio 3 Tall : 1 Dwarf (phenotypic); 1 TT : 2 Tt : 1 tt (genotypic).

(b) Conclusion: Principle of *Law of Segregation* → factors (genes) segregate during gamete formation without blending.

*(3 marks for cross + Punnett square + results, 2 marks for conclusion)

Answer Key – Section B (Chemistry)**

Q17 (MCQ)

Answer: (c) (i) and (iii)

Q18 (MCQ)

Answer: (d) Sodium acetate

Q19 (MCQ)

Answer: (b) Sodium (Na)

Q20 (MCQ)

Answer: (b) Both (II) and (IV)

Q21 (MCQ)

Answer: (b) CnH_2n_{+2}

Q22 (MCQ)

Answer: (b) C_2H_5OH

Q23 (MCQ)

Answer: (b) ZnO (Amphoteric oxide)

Q24 (Assertion-Reason)

Answer: (a) Both A and R are true and R is the correct explanation.

Q25 (2 marks)

1. Heating ferrous sulphate:

$2FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$

2. Action of cold water on calcium:

$Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2 \uparrow$

Q26 (3 marks)

(a) Reaction type → Exothermic combination reaction

(b) Product formed → Slaked lime [$Ca(OH)_2$]

(c) Equation:

$CaO + H_2O \rightarrow Ca(OH)_2$

OR

(i) Copper gets oxidised/corroded to basic copper carbonate which is greenish in colour.
(ii) No, iron will rust and the reddish layer of rust will come off exposing iron to air, the dome will not be stable. Copper on the other hand on corrosion forms a protective layer which does not allow further corrosion.
(iii) Copper is a highly malleable metal, its thin sheets can be used to give different shapes of roofs, like the shape of a dome.

Q27 (3 marks)

(a)Homologous series:Series of compounds with same functional group and a difference of $–CH_2$ between successive members.

(b) First two alkenes: C_2H_4 (Ethene), C_3H_6 (Propene)

(c) One property: They have similar chemical properties.

Q28 (4 marks)

(a) Two differences (Physical properties):

- Metals are malleable and ductile; non-metals are brittle.

- Metals conduct heat and electricity; non-metals generally do not.

(b) Reactions of Zinc:

(i) $Zn + 2HCl \rightarrow ZnCl_2 + H_2 \uparrow$

(ii) $ZnO + 2NaOH \rightarrow Na_2ZnO_2 + H_2O$

Q29 (5 marks)

(a) Neutralisation reaction: Reaction of acid with base to form salt and water.

Example: $HCl + NaOH \rightarrow NaCl + H_2O$

(b) Compound → Calcium carbonate ($CaCO_3$)

$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2 \uparrow$

(CO_2 turns lime water milky)

(c) Two uses of washing soda:

1. Used in softening hard water.

2. Used in glass, soap, and paper industries.

answer key for the Section C (Physics)

Q30. (b) Light travels slower in glass than in air.

Q31. (c) Ampere

Q32. (a) Both A and R are true and R is the correct explanation.

Q33. Power of a lens is the reciprocal of its focal length (in meters).

SI unit: Diopter (D).

Q34. Resistance increases by 800%

OR

Ratio will be 16:1

Q35. Object distance, u = -60 cm (calculated using lens formula).

Q36.

(a) Iris

(b) Rods and cones

(c) Rods are responsible for vision in dim light, cones are responsible for color vision.

Q37.

(a) (1) The electric current through the conductor produces a magnetic effect produced magnetic field.

(2) Magnetic force exerted by the magnetic field produced by a conductor causes the deflection in the magnetic needle.

We can also say electricity and magnetism are related to each other.

(b) (Diagram of magnetic field lines around a straight current-carrying conductor—circular concentric lines around the conductor).

Q38.

(a) Dispersion of white light is the splitting of white light into its constituent colors.

(b) A rainbow is formed due to the dispersion, reflection, and refraction of sunlight through water droplets in the atmosphere (diagram shows sunlight entering a raindrop, dispersing into spectrum, reflecting inside the drop, and emerging to form a rainbow).

Q39.

(a) Equivalent resistance in series R = R_1 + R_2 + R_3

Circuit diagram: three resistors connected end to end in series.

(b) Total resistance = 3ohm + 4ohm+ 5ohm = 12ohm,

Total current =2A,

Current across 3ohm resistor=2ohm,

Potential difference across 4ohm =8V