

4.8 GENERAL SCIENCE (237)

4.8.1 General Science Paper 1 (237/1)

SECTION A: BIOLOGY (34 marks)

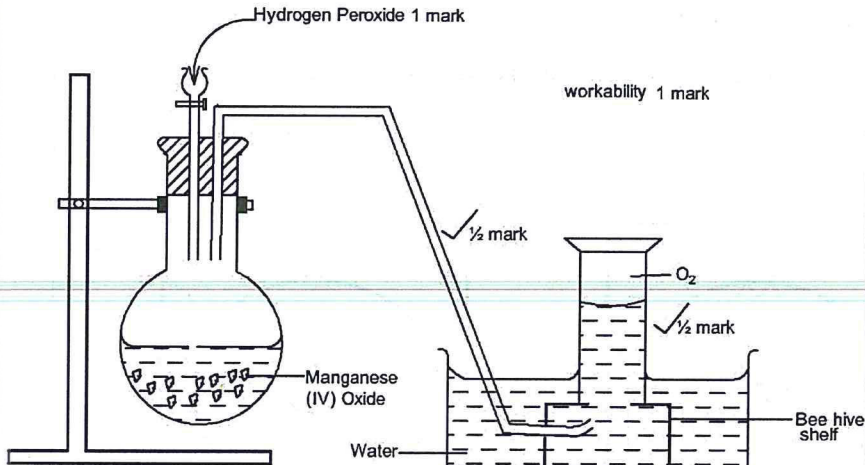
| | | |
|--------|--|-----------------------|
| 1. (a) | (i) Fungi; (ii) Protoctista/Protista; | (1 mark) (1 mark) |
| (b) | - To prevent accumulation of metabolic wastes to toxic levels/Ensures continuous removal of waste products to maintain a constant internal environment; 1x1 | (1 mark) |
| 2. (a) | (i) Synthesis of DNA, RNA and ribosomes; (ii) Packaging and secretion of glycoproteins/ secretion of synthesized proteins and carbohydrates and form lysosomes; | (1 mark) |
| 3. | $Mg = \frac{\text{Length of image}}{\text{Length of object}}$ $300,000 = \frac{4}{x};$ $x = \frac{4}{300,000} = 0.00001333cm;$ 3x1 | (3 marks) |
| 4. (a) | The rod tilted downwards towards F; | (1 mark) |
| (b) | Potato cylinder at F was placed in hypotonic solution; (distilled water) and it gained water by osmosis; hence became heavier; OR Potato cylinder at E was placed in hypertonic solution; lost water by osmosis; and became lighter. | (3 marks) |
| 5. (a) | (i) All the type arrangement and number of teeth in a mammal; (ii) Is half the number of the type, position, number and arrangement of various types of teeth on the upper and lower jaws of mammals; | (1 mark) (1 mark) |
| (b) | (i) $\left(\frac{Q}{3} + \frac{1}{1} + \frac{4}{4} + \frac{2}{3}\right) = 21$ $Q + 18 = 21$ $Q = 21 - 8$ $Q = 3$ (ii) $\frac{2}{3} = \frac{4}{6}; = 10;$ 2x1 | (1 mark) (2 marks) |

| | | |
|--------|---|--|
| 6. (a) | (i) Root; | (1 mark) |
| | (ii) Monocotyledon; | (1 mark) |
| | (iii) Vascular bundles arranged as a ring; and xylem alternates with phloem; presence of pith 1 x 1 | (1 mark) |
| (b) | Absorption of water and mineral salts | (1 mark) |
| 7. (a) | <ul style="list-style-type: none"> - Balloons inflate - Rubber sheet bulges downwards - Volume of belt jar increases - Air rushes into the balloon 3x1 | (3 marks) |
| (b) | Diaphragm | (1 mark) |
| 8. (a) | Respiration/Aerobic respiration | (1 mark) |
| (b) | Respiratory enzymes | (1 mark) |
| 9. | <ul style="list-style-type: none"> - Erector pili muscles contract and body hair stands to trap a layer of air for insulation against heat loss; - Vasoconstriction to direct blood vessels into a shunt to minimize heat loss; - Increased rate of metabolic activities to generate metabolic heat; - Shivering due to involuntary contraction of the skeletal muscles to generate heat. 4x1 | (4 marks) |
| 10. | <ul style="list-style-type: none"> - Tannins - Caffeine - Quinine - Cocaine - Cannabis - Rubber - Colehiahe - Gum Arabica - Papain - Khat 3x1 | (1 mark) (2 marks) (3 marks) |

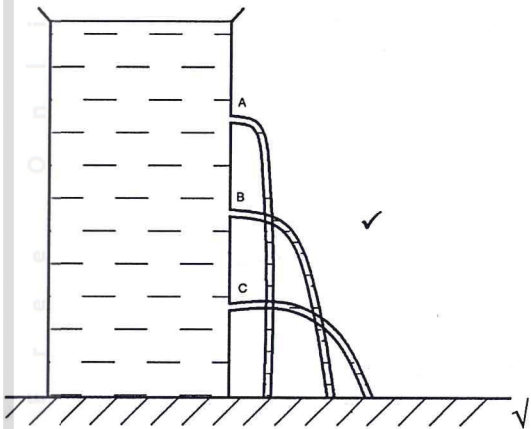
SECTION B: CHEMISTRY (33 marks)

| Qn No. | Responses | Marks |
|--------|--|-----------------------------------|
| 11.(a) | (i) Y (ii) (Marks re distributed to No. 18b) (iii) Z | (1 mark) (No mark) (1 mark) |
| (b) | $X^{1/2}$ and $W^{1/2}$ | (1 mark) |
| 12.(a) | (i) Copper (II) nitrate (ii) Copper (II) oxide | (1 mark) (1 mark) |
| (b) | $2Cu(NO_3)_{2(s)} \rightarrow 2CuO_{(s)} + 4NO_{2(g)} + O_{2(g)}$ | (1 mark) |
| 13.(a) | The ions in Lead (II) Bromide solid are immobile and therefore unable to conduct an electric current. | (1 mark) |
| (b) | Heat the Lead (II) Bromide to make the ions mobile. | (1 mark) |
| 14(a) | Ethanoic acid is a weak $^{1/2}$ acid while hydrochloric acid is a strong $^{1/2}$ acid. Hydrochloric acid completely $^{1/2}$ ionizes in solution while Ethanoic acid is partly $^{1/2}$ ionized in solution. - Hydrochloric acid solution has a higher hydrogen concentration than Ethanoic acid. | (2 marks) |
| (b) | Water softening is the removal of Ca^{2+} and Mg^{2+} from hard water. | (1 mark) |

| | | |
|--------|---|-----------|
| 15(a) | | (1 mark) |
| (b) | B | (1 mark) |
| (c) | <ul style="list-style-type: none"> - In food industry - Separate and detect contaminants such as aflatoxins - Detecting traces of flammable chemicals in burned materials from possible arson sites. <p>(1 correct = 1 mark)</p> | (1 mark) |
| 16 (a) | <ul style="list-style-type: none"> - Add water to the soil sample and shake to dissolve (½ mark) - Filter to remove insoluble particles and impurities. (½ mark) - Transfer about 5ml of the solution to a beaker and add universal indicator. (½ mark) - Compare its colour to the pH chart provided. (½ mark) | (2 marks) |
| 17(a) | | (2 marks) |

| | | |
|---------|--|-----------------------|
| (b) | <ul style="list-style-type: none"> - Seasoning food - Food preservative - Deicing roads in sub-freezing weather. <p>(1 correct = 1 mark)</p> | (1 mark) |
| 18(a) | Temporary/ physical change | (1 mark) |
| (b) | <ul style="list-style-type: none"> - Reaction is reversible (1 mark) - No change in mass (1 mark) - No new products are formed <p>(2 correct = 1 mark)</p> | (1 mark) (1 mark) |
| 19. (a) | (i) D – It has the least tendency to lose or gain electrons (ii) E | (2 marks) (1 mark) |
| (b) | $C_{2(g)} + H_2O_{(l)} \rightarrow HOCl_{(aq)} + HCl_{(aq)}$ | (1 mark) |
| 20.(a) | (i) Hydrogen gas (ii) It's a reducing agent | (1 mark) (1 mark) |
| (b) | Determining the melting point/ Freezing point or the boiling point | (1 mark) |
| 21.(a) |  <p>(i) H_2O_2</p> | (2 marks) (1 mark) |
| (b) | <ul style="list-style-type: none"> - Oxy-acetylene flame for welding - Steel making - Rocket fuel <p>(Any 1=1 mark)</p> | (1 mark) |

SECTION C: PHYSICS (33 marks)

| | | |
|-----|--|----------|
| 22. | Mechanics, Optics, Electricity, Magnetism, Waves, Atomic Physics, Thermodynamics ✓ (1 mark for any one correct branch of physics) | (1 mark) |
| 23. | $\text{Density} = \frac{\text{mass}}{\text{volume}}$ $= \frac{85.5}{7.5}$ $= 11.4 \text{ gcm}^{-3} \checkmark$ | 3 marks |
| 24. | Adhesive forces between glass and water molecules are greater ✓/ higher than cohesive forces between water molecules therefore adhesive forces ✓ pull water up the capillary tube. | 2 marks |
| 25. | <p>(a)</p>  <p>(b) – Pressure is greatest/highest/most at C ✓ and therefore the jet is longest or Pressure is least/lowest at A and therefore the jet is shortest</p> <p>– Pressure increases with depth ✓.</p> | 1 mark |
| | | 2 marks |
| 26. | <p>Molecules in a solid are closely packed and are <u>continuously vibrating about fixed positions</u> while molecules in a liquid <u>move freely/slide over each other in constant motion</u> unlike those of a solid. ✓</p> <p>The spacing/distance between the molecules of a solid is smaller ✓ than the spacing/distance between molecules of a liquid.</p> | 2 marks |

| | | |
|-----|---|---------|
| 27. | $F = ke \checkmark$ $5 = ke$ $k = 5/e \text{ Ncm}^{-1} \checkmark$ | 2 marks |
| 28. | PE----- \checkmark -KE----- \checkmark SOUND/HEAT | 2 marks |
| 29. | $B \checkmark$ Since B has a lower centre of gravity \checkmark | 2 marks |
| 30. | Expansion gaps and use of rollers. \checkmark | |
| 31. | AB – accelerating uniformly/constantly or velocity increasing uniformly with increase in time. \checkmark BC – moving with uniform velocity or zero acceleration \checkmark CD – decelerating uniformly/constantly or velocity decreasing uniformly with increase in time. \checkmark | 3 marks |
| 32. | Moment of a force = Force X Perpendicular distance \checkmark $12 = F \times \frac{100}{100} \checkmark$ $F = 12 \text{ N} \checkmark$ | 3 marks |
| 33. | (a) Vacuum between glass walls/cork/lid/plastic top/cover \checkmark (b) Glass walls/cork/vacuum between walls \checkmark (c) Silvering/shinny/polishing the inside walls \checkmark | 3 marks |
| 34. | - By oiling/greasing/use of lubricant \checkmark - By using rollers/ball bearings \checkmark - By polishing/smoothening the surfaces in contact (Any two) | 2 marks |
| 35. | Weight of water displaced = weight of log \checkmark $= mg$ $m = \frac{200}{10} \checkmark$ $= 20 \text{ kg} \checkmark$ | 3 marks |