4.7 GENERAL SCIENCE (237)

4.7.1 General Science Paper 1 (237/1)

SECTION A : BIOLOGY

1. (a) The study of plants; (1 mark)

(b) It gives two names to an organism, generic and specific names; The generic name starts with a capital letter while the specific name starts with a small letter; the names should be underlined / or italicized;
(2 marks)

2. (a) (i) Directs/reflect light onto the specimen;
(ii) Places desired objective lens into position;
(2 marks)

(b) Tissue - a group of similar cells performing a function;
Organ system - a group of (connected) organs functioning as a unit;
(2 marks)

3. (a) Movement of substances against concentration gradient across cell membranes using energy; (1 mark)

(b) (i) Absorption of ions/mineral salts; (1 mark)

(ii) Absorption of water; (1 mark)

4. (a) Small intestines/ileum; (1 mark)

(b) Provision of oxygen; (1 mark)

5. (a) Transparent / have no chlorophyll;

Thin/one cell thick; (2 marks)

(b) (i) Formation of blood; (1 mark)

(ii) Formation of teeth and bones;

- Participates in blood clotting. (1 mark)

6. (a) Low temperature; high humidity/high soil water;

Low wind velocity; low light intensity;
First two correct. (2 marks)

(b) (i) Defence; (1 mark)

(ii) Participates in blood clotting; (1 mark)

7. (a) *Bordetella pertussis*; (1 mark)

(b) (i) Diaphragm flattens;

(ii) Rib cage is lifted upwards and outwards. (2 marks)

8. (a) Carbon dioxide; alcohol; energy;

First two correct. (2 marks)

(b) Thin walled to reduce diffusion distance;
Numerous to increase surface area;
Moist to dissolve diffusing substances;

First two correct. (2 marks)

9. (a) K - Bowman's capsule; (1 mark)

(b) Ultrafiltration; forces all small molecules into the Bowman's capsule;
before useful ones can be re-absorbed back again.
(2 marks)

10. (a) Failure of the pancreas to secret enough insulin/
Failure of the liver to convert glucose into glycogen;
leading to excess sugar in the blood; (2 marks)

(b) When it is hot, sweat is produced on the skin;
The sweat uses heat from the body to evaporate thereby cooling the body;
(Latent heat of vaporisation)
(2 marks)

SECTION B : CHEMISTRY (33 marks)

11. Heat the mixture $\surd(\frac{1}{2})$ for ammonium chloride to sublime and collect the sublimate; $\surd(\frac{1}{2})$.
Add water $\surd(\frac{1}{2})$ to dissolve sodium chloride and decant / filter $\surd(\frac{1}{2})$ to obtain sand as the residue and sodium chloride solution; Evaporate sodium chloride solution to dryness $\surd(\frac{1}{2})$ to obtain sodium chloride crystals. $\surd(\frac{1}{2})$

OR

Add water, filter off sand, carry out fractional crystallization, to obtain $NaCl_{(s)}$ filter off $NaCl_{(s)}$ evaporate filtrate to dryness to obtain NH_4Cl.
(3 marks)

12. (a) Curve I $\surd(\frac{1}{2})$;

Curve I does not have definite temperature change / constant temperature change. $\surd(1)$
($1\frac{1}{2}$ marks)

(b) Melting point. $\surd(\frac{1}{2})$ ($\frac{1}{2}$ mark)

13. (a) Calcium hydrogen carbonate + Dilute hydrochloric acid → Calcium chloride + Carbon (IV) oxide + Water; $\surd(1)$ (1 mark)

(b) Sulphuric (VI) acid. $\surd(1)$ or sulphuric acid (1 mark)

14. (a) Oxygen / O_2 √(1) (1 mark)

(b) Reaction slows down / less production of gas Q √(1)
Manganese (IV) oxide is a catalyst or increases rate of decomposition of hydrogen peroxide. √(1) (2 marks)

(c) Gas Q slightly soluble in water. √(1) (1 mark)

15. (a) White magnesium oxide remains white. √(1) (1 mark)

(b) Hydrogen is below magnesium in the reactivity series hence it can not reduce its oxide. √(1)
OR
Hydrogen is less reactive than magnesium, so it cannot reduce magnesium oxide.
(1 mark)

(c) Hydrogen gas/H_2. √(1) (1 mark)

16. (a)

Element	No. of protons	No. of electrons	No. of neutron	Atomic Mass
X	12 √(½)	12	12	24 √(½)
Y	8	8 √(½)	8	16 √(½)
Z	8 √(½)	8	10 √(½)	18

(3 marks)

(b) Y and Z are isotopes √(1) (1 mark)

17. (a) Weak acid is one that does not ionize/dissociate completely in aqueous solution. √(1)
(1 mark)

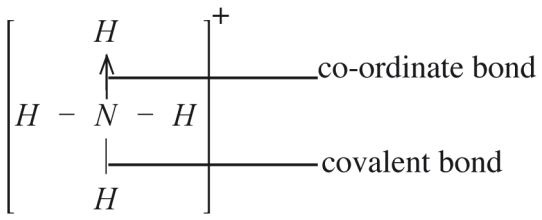
(b) (i) Sodium hydroxide or potassium hydroxide. √(1) (1 mark)

(ii) Sulphuric (VI) acid √(1) or Hydrochloric acid / Nitric (V) acid/Nitric acid or Sulphuric acid. (Accept correct formulae) (1 mark)

18. (a) Ionic bond / Electrovalent √(1). (1 mark)

(b) Covalent bonds √(1)
Co-ordinate / Dative bond √(1) (2 marks)

OR



19. In the molten lead (II) iodide, the ions are mobile √(½) hence conducts electricity √(½)while in solid lead (II) iodide, the ions are at fixed √(½) positions hence does not conduct electricity.√(½) (2 marks)

20. (a) Ionisation energy for R is higher than that of S √(1). R is smaller in size than S √(½) making outer electron in R more difficult to remove since nuclear attraction on outermost electrons in R is higher √(½). (2 marks)

(b) 2.8 √(1) (1 mark)

(c) (i) Group 4 √(½) (½ mark)

(ii) Period 3 √(½) (½ mark)

21. (a)

Salt	Adding water	Heating
Lead (II) carbonate	Does not dissolve √(½)	Forms yellow solid when hot turns reddish-brown solid on cooling √(½)
Lead (II) nitrate	Dissolves to form colourless solution √(½)	Brown fumes produced √(½) Yellow when hot, turns reddish-brown solid on cooling (any one observation)

(2 marks)

(b) - Making builder's mortar and plaster √(1)
- In agriculture to reduce/prevent too much acidity
- Making bleaching powder
- For detecting Carbon (IV) oxide gas in laboratory
- In softening hard water
- In scrubbing in contact process

(Any 1 correct)

(1 mark)

SECTION C : PHYSICS

22. Volume = 20 - 10

= $10\ cm^3$ √

Density = $\frac{\text{Mass}}{\text{Volume}}$ √

= $\frac{8}{10}$

= $\underline{0.8\ gcm^{-3}}$ √

23. The forces involved √ are cohesive and adhesive forces √.

The adhesive forces between the water molecules and the metal surface is greater √ than the cohesive forces between water molecules.√

24. Pressure = $h\rho g$ √

= $\frac{640 \times 1.36 \times 10^4 \times 10}{1000}$ √

= 87040 Nm^{-2} √

25. The large dust particles are being bombarded by the tiny air particles √ , which are in continuous random motion. √

26. (a) The wire gauze prevents the glass from being heated at one point, √

(b) Since the wire gauze is a good conductor √ it conducts the heat evenly √ to a large area of the glass container.

27.
- It is a good conductor of heat.
- It is visible (opaque).
- It has a wide range of temperature (high boiling point and low freezing point).
- It expands / contracts uniformly.

(any two correct)

28. Clockwise moment = Anticlockwise moment √

$30 \times x = 50(2 - x)$ √

$30x = 100 - 50x$

$80x = 100$

$x = 1.25m$ √

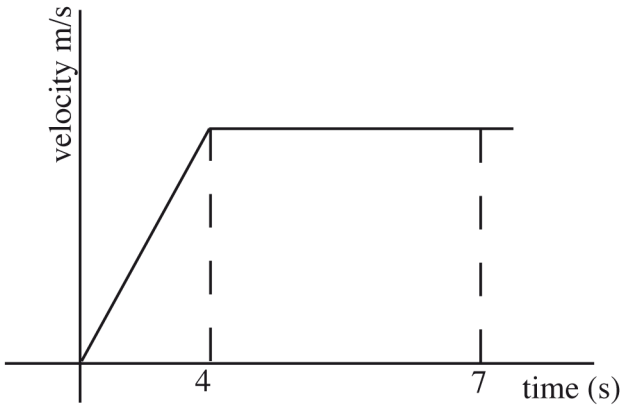
29. The Center of gravity is raised √ thus reducing the stability √ of the block.

30. $F = Kx$ $K = \frac{25}{0.4}$

$F = \frac{25 \times 0.96}{0.4}$ √

= 60N √

31.



- labelled axis √
- accelerating for first 4 seconds √
- uniform velocity between 4 seconds and 7 seconds √

32.
- The reaction force from the supporting surface. √
- Nature of the surfaces in contact. √

33. Potential √ ⟶ kinetic √ ⟶ sound/heat

34. (a) The sphere that floated was hollow while the other one was a solid sphere.

(b) The floating sphere experienced an upthrust equal to its own weight. √
The sinking sphere experienced an upthrust lower than its own weight. √