5.5 GENERAL SCIENCE (237)

5.5.1 General Science Paper 1 (237/1)

SECTION A: BIOLOGY (34 marks)

1. (a) The child requires more energy than an adult for rapid cell division/ growth; and high activity/ high metabolic rate; (2 marks)

   (b) A translucent mark; when the food substance is rubbed on a piece of paper confirms presence of lipids; (2 marks)

2. (a) Amoeba/ plasmodium/ paramecium/ spyrogyra; (1 mark)

   (b) Kingdom: plantae; (1 mark)
   Division: spermatophyta; (1 mark)

3. (a) Osmosis; (1 mark)

   (b) Visking tube bulged because sugar solution is hypertonic; and distilled water is hypotonic; therefore water molecules moved into the visking tube by osmosis; (3 marks)

4. (a) (i) Artery;
   (ii) Thick walled/ small lumen; (2 marks)

   (b) Have valves; to prevent backflow of blood;
   Has large lumen/ is lined with smooth muscles; to facilitate smooth flow of blood;
   Any one correct (2 marks)

5. (a) Excretion is the elimination of metabolic waste products;
   Egestion is the elimination of undigested and indigestible materials from the alimentary canal; (mark as a whole) (2 marks)

   (b) The hypothalamus sends impulses to the liver to increase exothermic metabolic reactions; when the temperature is low/ increase endothermic metabolic reactions when the temperature is high; (2 marks)

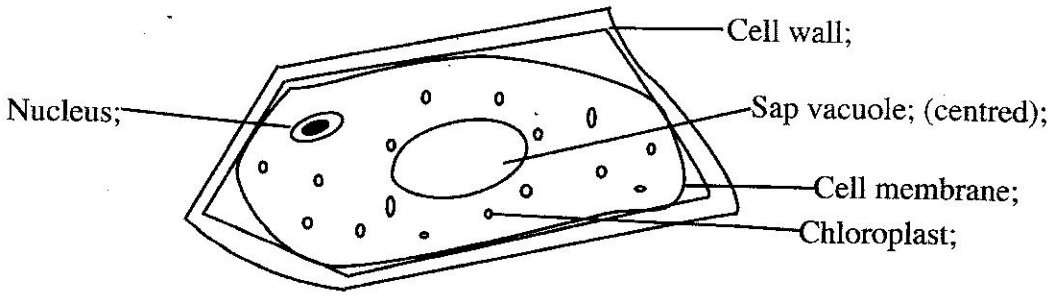
   (c) Poor diet lacking certain vitamins and inadequate water intake;
   Chemical salts in urine; (2 marks)

6. (a) Fermentation/ anaerobic respiration; (1 mark)
   (b) Lime water turns white/ white precipitate is formed; air bubbles produced; (2 marks)

7. (a) Boiled water contained no gases/ carbon (IV) oxide; oil layer prevented entry of atmospheric carbon (IV) oxide; (2 marks)

   (b) oxygen; (1 mark)

8.



(3 marks)

9. (i) Exercise

(ii) Age

(iii) Emotions

(iv) Health

(4 marks)

SECTION B: CHEMISTRY (33 marks)

10. J - Sublimation √½, K - Melting √½.

11. (a) Dilute sulphuric (VI) acid + solid Sodium carbonate ⟶ √1
Sodium sulphate + Carbon (IV) oxide + water.

(b) Used in making drugs, soap, soapless detergents, fertilizers and in cleaning metals.
(Any one correct) √1

12. (a) I - In I there is no air/dissolved oxygen since water is boiled √1.

II - In II there is no water vapour/water. √1

(b) Rusting would take less time/ Nails would rust more and faster. √1

(c)

Substance	Type of oxide	
Hydrogen	Neutral	
Phosphorus	Acidic	√½
Magnesium	Basic	√½

13. (a) $H_2(g) + CuO(s) \longrightarrow Cu(s) + H_2O(l)$. √1 Accept $H_2O_{(g)}$

(b) Hydrogen is oxidised, since it gains oxygen to form water. √1

(c) Excess / unreacted hydrogen burns/hydrogen. √1

14. (a) $\frac{12\times98.8+13\times1.2}{100}=\frac{1185.6+15.6}{100}$ √1 or $\left(\frac{12\times98.8}{100}\right)+\left(\frac{13\times1.2}{100}\right)$

$=\frac{1201.2}{100}=12.012$ √½ $= 12.012$

or

$= 12.01$ √½ (2 marks)

(b) (i) $X^{3+} \longrightarrow 2.8$ √½

(ii) $Y \longrightarrow 2.8.7$ √½

(c) XY_3 √1

15. (a) T, √½ has highest number of energy √½ levels, with one electron in outermost √½ energy level which is weakly attracted by the nucleus hence readily removed during reaction. √½ (2 marks)

(b) S because its outermost energy level has the maximum number of electrons (octet) hence stable/has the outermost energy level filled. √1

(c) Q √½ /Be/Beryllium

(d) ionic/ electrovalent. √½

16. (a) Mainly caused by sulphates (SO_4^{2-}) of either Mg^{2+} or Ca^{2+}/dissolved $MgSO_4$, $CaSo_4$ or $Mgcl_2$ and $Cacl_2$. (2 marks)

(b) Boiling. (1 mark)

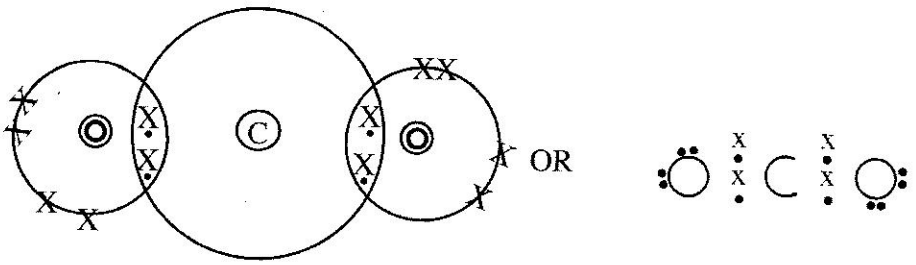
17. Add solid Calcium carbonate in small amounts to the hydrochloric acid while stirring and continue until in excess when effervescence stops √1. Filter the mixture to collect the calcium chloride filtrate √1. Heat the filtrate to dryness to obtain the solid calcium chloride √1. (3 marks)

18. (a) (i) The water molecules absorb heat energy √½ increasing their kinetic energy √½ resulting in increased collisions among molecules √½. (1½ marks)

(ii) The energy absorbed ½ by the water molecules is used to break the intermolecular forces √½ making water molecules to change to vapour √½. (1½ marks)

(b) Separating funnel/ burette/dropping funnel. (1 mark)

19. (a)



(2 marks)

(b) Graphite has delocalised electrons/mobile electrons. (1 mark)

20. Experiment II √1 because molten potassium bromide √1 contains free/ mobile ions.

(2 marks)

SECTION C: (33 marks)

21. Volume = (140 - 80) cm^3 = 60 cm^3;

Density = $\frac{\text{mass}}{\text{volume}} = \frac{144g}{60cm^3}$;

= 2.4 g cm^{-3}.

(3 marks)

22. Weight = mass acceleration due to gravity;

Mass = $\frac{\text{weight}}{\text{acceleration}} = \frac{23.5}{10}$;

= 2.35 kg.

(3 marks)

23. (a) The height of the air column at sea level is greater than the height of the air column at the higher altitude. (1 mark)

(b) When the piston is pulled upward the pressure inside the syringe becomes less; than the atmospheric pressure. The atmospheric pressure then pushes the liquid into the syringe.

(2 marks)

24. The tiny particles of a gas are free to move to occupy any available space in the container.

(1 mark)

25. (a) The degree of hotness (or coldness);

(b) When the bimetallic becomes very hot it bends upward and disconnects the circuit; when the bimetallic cools it straightens and reconnects the circuit. (3 marks)

26. Heated molecules vibrate faster and make the neighbouring molecules to also vibrate faster.

(2 marks)

Vibration is relayed to other molecules in the solid hence conduction of heat.

27. 20 x 10 + 100 F = 15 x 40;

100 F = 600 - 200

F = $\frac{400}{100}$ = 4 N;

(3 marks)

28. (a) Stable; (1 mark)

(b) When displaced slightly, the glass does not topple the C.O.G is raised/ C.O.G remains within the base. (1 mark)

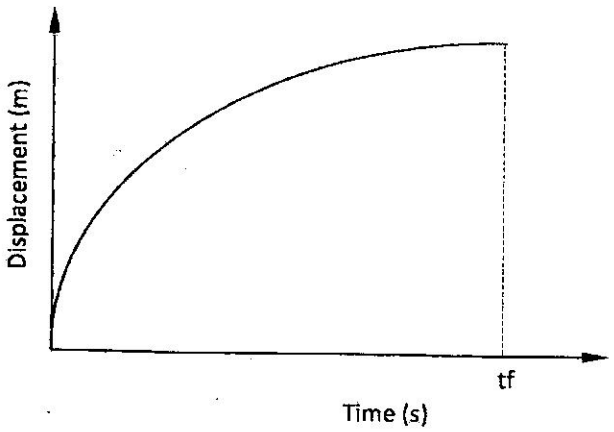
29. Spring constant = slope;

$$= \frac{(5-0)\text{N}}{(0.10-0)\text{M}} \quad \text{;substitution}$$

$$= 50 \text{ N/m.}$$

(3 marks)

30.

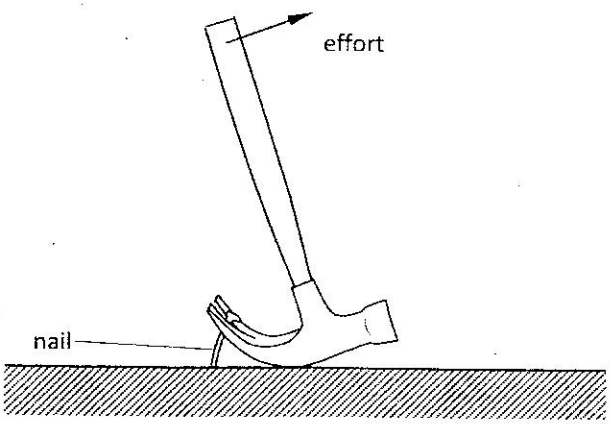


- curve of decreasing gradient;
- gradient of curve is zero at point tf.

(2 marks)

31. When the wheelbarrow is in motion the box is also in motion; When the wheelbarrow is stopped suddenly the box continues in its state of motion and hence slides forward. (2 marks)

32. (a)



(1 mark)

(b) Light energy changes to electrical energy; Electrical energy changes to chemical energy; in the car battery.

OR

Light Electrical Chemical (2 marks)

33. (a) Reading decreases; (1 mark)

(b) Block displaces more water; hence more upthrust on the block. (2 marks)