

5.5.2 General Science Paper 2 (237/2)

SECTION A: BIOLOGY

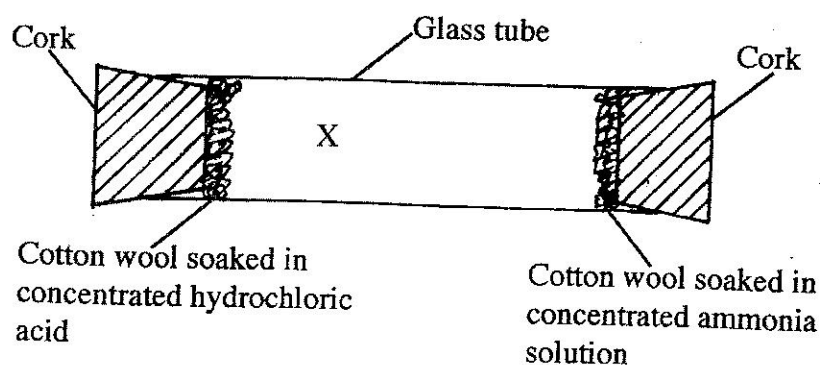
1. (a) Q - Animals;
R - Ammonia/NH₄;
S - Nitrates; (3 marks)
- (b) Nitrogen fixation; (1 mark)
- (c) Fungi/saprohytic organisms; Bacteria;
(any one correct) (1 mark)
2. (a) (i) Produce ova; produce hormones;
(any one correct) (1 mark)
- (ii) Temporary storage of sperms;
place where sperms develop motility;
(any one correct) (1 mark)
- (b) The time between fertilization and birth. (1 mark)
3. (a) Growth is quantitative increase in size which is permanent;
Development is qualitative changes involving differentiation; to form
tissues. (1 mark)
- (b) To survive adverse conditions;
To allow dispersal;
To allow embryo to mature; (3 marks)
4. Continuous variation has intermediates for a particular characteristic while
discontinuous variation has no intermediates; (1 marks)
- Continuous variation is influenced by both genes and environment while
discontinuous variation is influenced by genes only; (1 mark)
5. (a) (i) Organisms with favourable variations survive and reproduce while
those with unfavourable variations reduce in numbers/become extinct; (1 mark)
- (ii) Industrial melanism/peppered moth;
Resistance to drugs/pesticides/antibiotics;
(any one correct) (1 mark)
- (b) Thick cuticle; secretion of antienzymes/mucus;
(any one correct) (1 mark)
6. (a) Thigmotropism/Haptotropism; (1 mark)
- (b) Support; exposure to light; (2 marks)

7. (a) (i) Myelin sheath; (1 mark)
(ii) U-has dendrites which receive impulses from other neurones; (1 mark)
- (b) Semi-circular canals; (1 mark)
8. (a) hinge joints; ball and socket joints; gliding joints; pivot joint;
(first two correct) (2 marks)
- (b) Packing; mechanical support;
(first one correct) (1 mark)
9. (a) Attachment of zygote to the wall of the uterus; (1 mark)
- (b) Avoid indiscriminate sex/kissing;
Avoid sharing of needles and syringes; (2 marks)
10. Father produces two types of gametes/sperms X and Y;
Mother produces only one type of gamete/ova X;
When an ovum is fertilized by the Y sperm, a boy results;
An ovum fertilized by the X sperm forms a girl; (4 marks)

SECTION B

CHEMISTRY (33 Marks)

11. (a) A white ring is formed in the glass tube. (1 mark)
- (b) (i) The cross (X) should be nearer to the source HCl (g). (1 mark)



- (ii) Since ammonia (RMM = 17) is less dense than HCl gas (RMM = 36.5), it will diffuse faster than HCl. (1 mark)

12. $\text{CaCO}_3 \checkmark = 40 + 12 + 48 = 100 \checkmark$

$$\frac{0.1 \times 100}{1} = 10 \text{g} \checkmark$$

(2 marks)

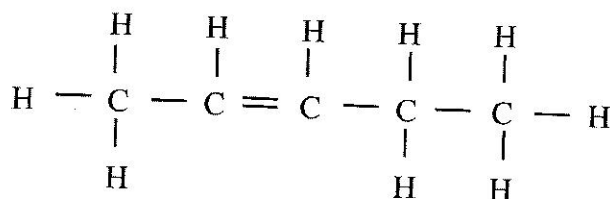
13. (a) Blue litmus paper will turn to red and then bleached/turns white. (1 mark)

(b) Litmus paper turned to red because chlorine is acidic and then decolourised/turned white because the gas is a bleaching agent. (1 mark)

14. (a) (i) 2 - bromobutane

(1 mark)

(ii)



(1 mark)

(b) Place acidified potassium manganate (VII)/bromine water in separate test tubes. Bubble the gases separately through the solutions. With but-1-ene, the two solutions will be decolourised while butane will not decolourise both solutions. (2 marks)

15. (a) (i) The water comes out in form of a "fountain". (1/2 mark)

(ii) This is due to the partial vacuum $\sqrt{1/2}$ that is created in the flask as a lot of the ammonia gas dissolves $\sqrt{1/2}$ in the first drop of water and the water is forced rapidly up the tube and enters the flask as fountain. $\sqrt{1/2}$ (1 1/2 marks)

(b) Ammonium chloride salt (NH_4Cl)
Calcium hydroxide ($\text{Ca}(\text{OH})_2$)

(1 mark)

(i) Bubble but-1-ene and butane through separate test tubes containing acidified potassium manganate (vii). Acidified KMnO_4 will turn from purple to colourless with butane.

(ii) Bubble but-1-ene and Butane through separate test tubes containing bromine water. Bromine water is decolourised by but-1-ene but it remains brown with butane.

But-1-ene burns with sooty luminous flame but butane burns with blue non-luminous flame.

Bubble but-1-ene and butane through separate test tubes containing acidified potassium dichromate (VI).

But-1-ene turns acidified potassium dichromate (VI) from orange to green but remains orange with butane.

- (c)
- Large quantities of ammonia gas used to make fertilizers
 - Liquid ammonia used as a refrigerant
 - Ammonia solution is used as a solvent in laundry
 - Manufacture of ammonia salts.
 - Ammonia gas used in manufacture of nitric (V) acid.
 - Manufacture of dyes and fibres.
 - Manufacture of fibres.

- Used to soften hard water.

(Any two correct)

(1 marks)

16. (a) the reaction is exothermic. $\sqrt{1}$ $\sqrt{1}$ (1 mark)
- (b) The equilibrium will shift to the right since the volume of product is less than that of reactants. (2 marks)
- (c)
 - Purifying petroleum products
 - Manufacture of sulphuric (VI) acid
 - Bleaching fumigant and as food preservative.
 (Any one correct)(1 mark)
17. (a) A fuel is a material that releases heat energy when burned. (1 mark)
- (b) $C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$ (1 mark)
- (c)
 - High heat content
 - Does not lead to deforestation
 - Easy to transport
 - Cleaner fuel than charcoal.
 - Easier to ignite
- (d) Solar, Geothermal, wind, hydroelectricity & tidal waves. (Any two correct marks) (2 marks)
18. (a) Na_2SO_4 RFM = $(23 \times 2) + 32 + (16 \times 4)$
 $= 46 + 32 + 64 = 142 \sqrt{1/2}$
 $= \frac{142}{142} = 1 \text{ mole } \sqrt{1/2}$
- 500cm³ contains 1 mole
 1000cm³ would contain ?
- $\frac{1000}{500} \times 1 \sqrt{1/2}$
 $= 2 \text{ M } \sqrt{1/2}$ (2 marks)
- (b) $M_1 V_1 = M_2 V_2$
 $2 \times V_1 = 0.5 \times 1000 \sqrt{1/2}$
- $V_1 = \frac{0.5 \times 1000 \sqrt{1/2}}{2} = 250 \text{ cm}^3 \sqrt{1}$ (2 marks)
19. (a) (i) $Fe_2O_{3(s)} + 3CO_{(g)} \longrightarrow 2Fe_{(l)} + 3CO_{2(g)}$ (1 mark)
- (ii) Decomposes to give carbon (IV) oxide and calcium oxide which are both used in the process. (1 mark)
- (iii) Calcium oxide react with silica to give calcium silicate (slug) which form a liquid layer on top of liquid iron as it flows away. (2 marks)
- (b) Steel (1 mark)

SECTION C

PHYSICS (33 Marks)

1. Magnification = $\frac{\text{Image height}}{\text{object height}}$; = 0.5

$$\begin{aligned}\text{Image height} &= 0.5 \times \text{object height} \\ &= 0.5 \times 24 \text{ cm;} \\ &= 12 \text{ cm;} \end{aligned}$$

(3 marks)

2. The glass rod is positively charged;

(1 mark)

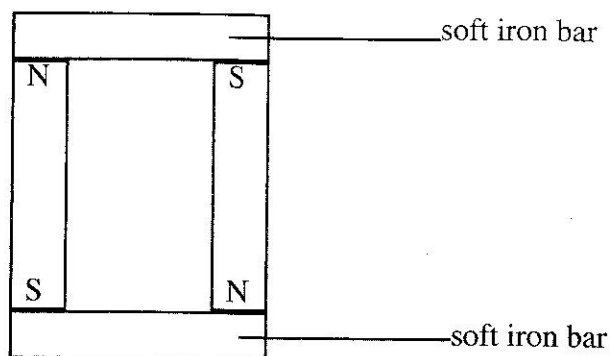
3. (a) carbon powder - to increase conductivity between the carbon rod and the zinc case;

(1 mark)

(b) manganese IV oxide - a depolarizer;

(1 mark)

4.



(1 mark)

5. - Transverse wave;

- Movement of the block is perpendicular to the direction of the wave motion;

(2 marks)

6. A vacuum was created by pumping the air out of the jar;

Sound requires a material medium for propagation;

(2 marks)

7. (a) IV;

(b) 0.3 A;

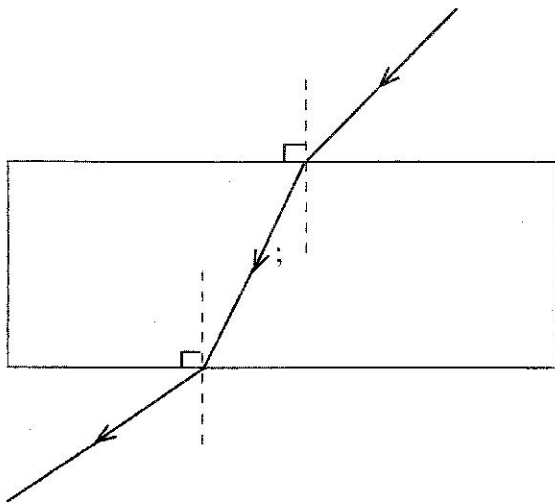
(2 marks)

8. Heat will increase;

Reducing resistance increases the current;

(2 marks)

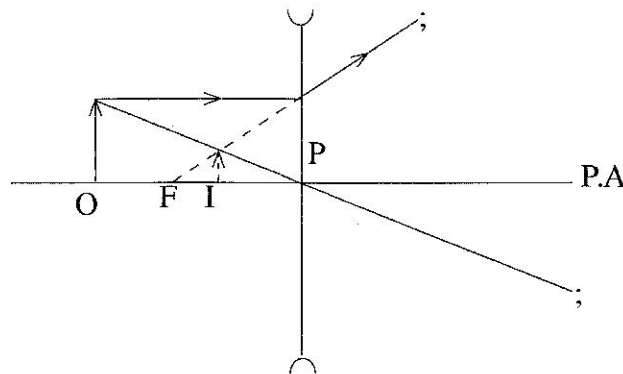
9.



Refracted Ray Bending Towards Normal;
Emerging ray bending away from normal;

(2 marks)

10.



Ray from O parallel to PA then from lens;
Ray from O through pole P;
Image erect virtual at intersection of they rays;

(3 marks)

11. Periodic time = 0.4 seconds;

(1 mark)

12. (a) Stepping up reduces current of transmission;
hence reducing heat loss;

(2 marks)

(b) To isolate all parts which are connected to the live wire;
When there is excess current.

(1 marks)

13. (a) Anode;

(b) To heat the cathode;

(c) The screen glows;

(3 marks)

14. (a) Increase the anode voltage;

(b) X-rays have no charge;

(2 marks)

15. Radioactive emission enters the tube and causes ionization; of the gas inside the tube.

Opposite charges are attracted to opposite electrodes creating a current;

(2 marks)

16. By doping; with Group 5 element;

(2 marks)