

**5.5.2 General Science Paper 2 (0237/2)**

**SECTION A: BIOLOGY**

1. (a) Q Animals;  
R Ammonia/NH<sub>4</sub>;  
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; (3 marks)  
To allow embryo to mature;
4. Continuous variation has intermediates for a particular characteristic (1 marks)  
while discontinuous variation has no intermediates;
- Continuous variation is influenced by both genes and environment (1 mark)  
while discontinuous variation is influenced by genes only;
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;

one correct)

6. (a) Thick cuticle; secretion of antienzymes/mucus; (any one correct) (1 mark)
- (b) Thigmotropism/Haptotropis (1 mark)
- (a) m; Support; exposure to light; (2 marks)

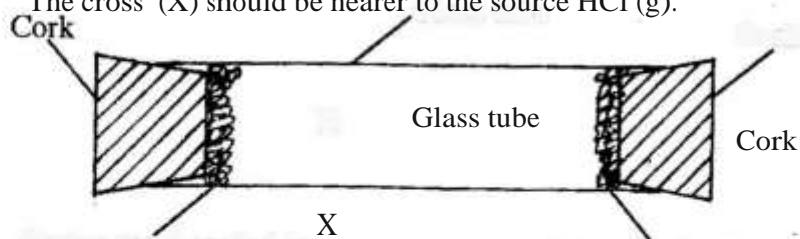
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7. (a) (i) Myelin sheath; (1 mark)  
(ii) U-has dendrites which receive impulses from other neurones; (1 mark)
- (b) Semi-circular canals; (1 mark)
8. (a) hinge joints; ball and socket joints; gliding joints; pivot joint;  
(first two correct) (2 marks)
- (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)



Cotton wool soaked in  
concentrated hydrochloric  
acid

Cotton wool soaked in  
concentrated ammonia  
solution

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

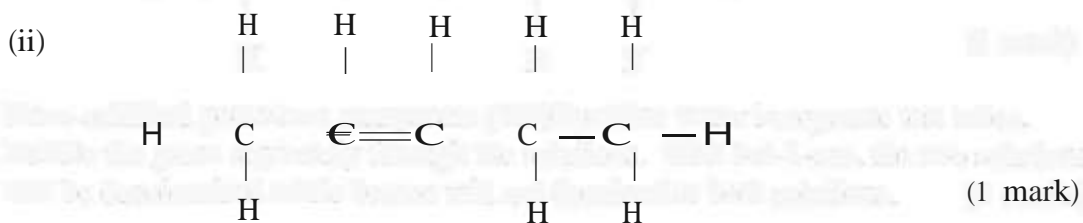


12.  $\text{CaCO}_3 = 40 + 12 + 48 = 100$   
 $\frac{10}{100} \times 100 = 10 \text{ g}$  (2 marks)

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)



(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". (✓)

(ii) (1 mark) This is due to the partial vacuum that is created in the flask as a lot of the ammonia gas dissolves in the first drop of water and the water is forced rapidly up the tube and enters the flask as fountain. (1✓ marks)

(b) Ammonium chloride salt ( $\text{NH}_4\text{Cl}$ )  
 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  $\text{KMnO}_4$  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.

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- Used to soften hard water.

(Any two correct) (1 marks)

16. (a) the reaction is exothermic. (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)  $C_s + O_2 = CO_2$  (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) (2marks)

18. (a)  $RFM = (23 \times 2) + 32 + (16 \times 4)$   
 $= 46 + 32 + 64 = 142$  ✓  
 $\frac{142}{142} = 1 \text{ mole}$  ✓

500cm<sup>3</sup> contains 1 mole  
1000cm<sup>3</sup> would contain ?

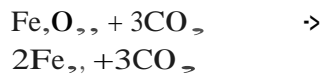
$$\frac{1000}{500} \text{ W/}$$

$$= 2M \text{ ✓}$$

(2 marks)

(b)  $M_1 V_1 = M_2 V_2$   $WE$   
 $2 \times V_1 = 0.5 \times 1000$  ?  
 $0.5 \times 1000 = 500$   
 $\frac{500}{2} = 250 \text{ cm}^3$  (2 marks)

19. (a) (i) \_\_\_\_\_  
(ii) (b) Steel  
(iii) \_\_\_\_\_



(1 mark) Decomposes to give carbon (IV) oxide and calcium oxide which are both used in the process.

(1 mark) Calcium oxide react with silica to give calcium silicate (slag) which form a liquid layer on top of liquid iron as it flows away.  
(2 marks)

(1 mark)

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3



**SECTION C**

**PHYSICS (33 Marks)**

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

Image height =  $0.5 \times \text{object height}$   
 $= 0.5 \times 24 \text{ cm};$   
 $= 12 \text{ cm};$

(3 marks)

2. The glass rod is positively charged;

(1 mark)

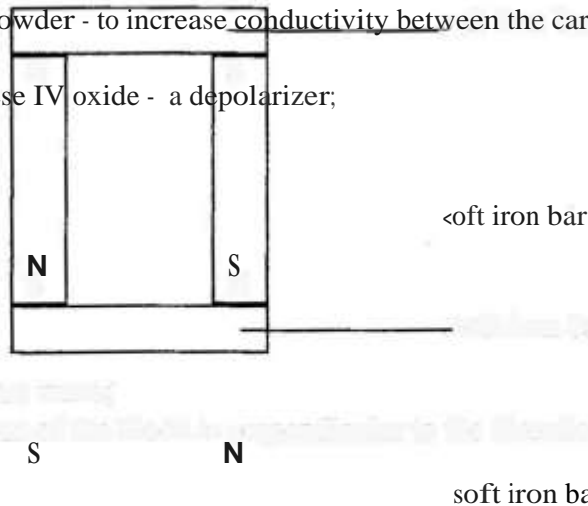
3. (a) carbon powder - to increase conductivity between the carbon rod and the zinc case;

(1 mark)

(b) manganese IV oxide - a depolarizer;

(1 mark)

4.



soft iron bar

soft iron bar

(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) 0.3A;

(2 marks)

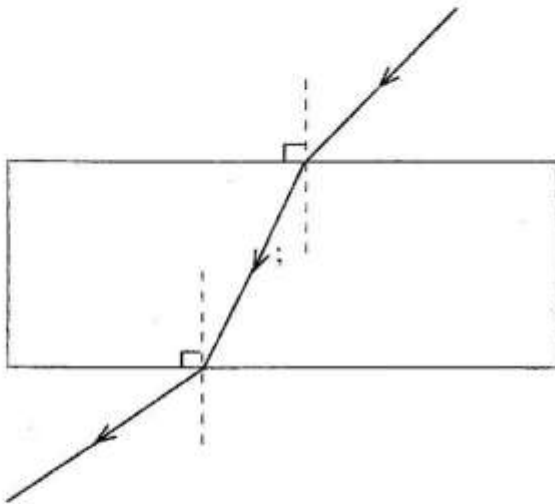
8. Heat will increase;

Reducing resistance increases the current;

(2 marks)



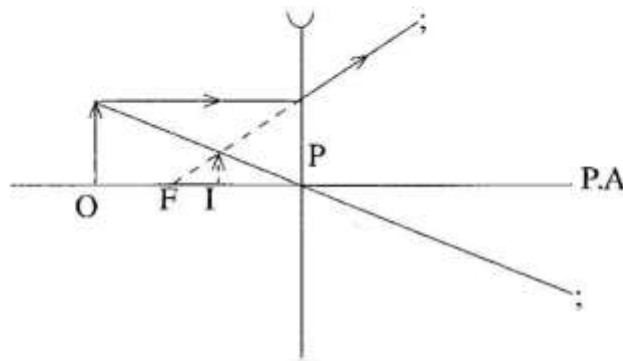
9.



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

(2 marks)

10.



$n$

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)

