

4.8 GENERAL SCIENCE (237)

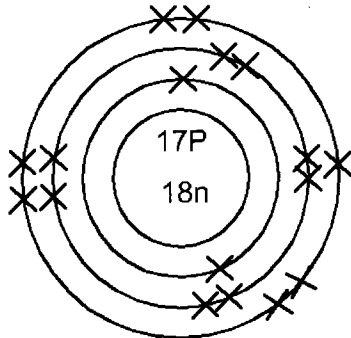
4.8.1 General Science Paper 1 (237/1)

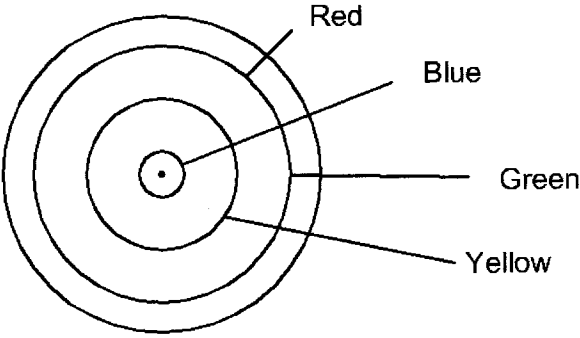
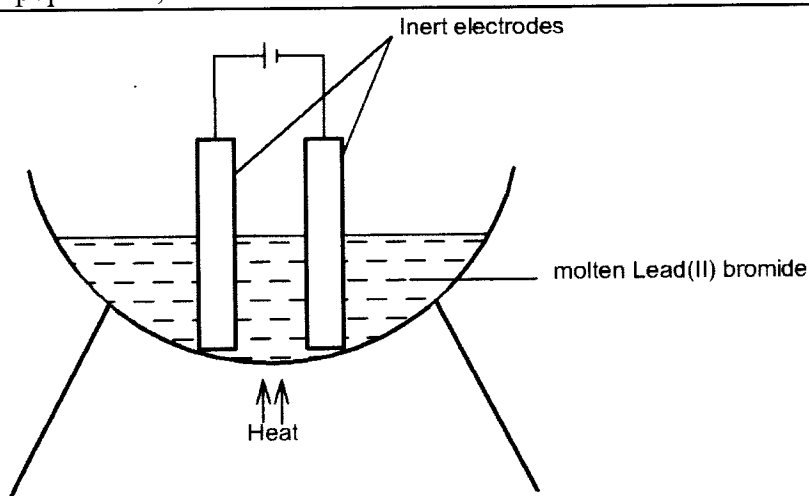
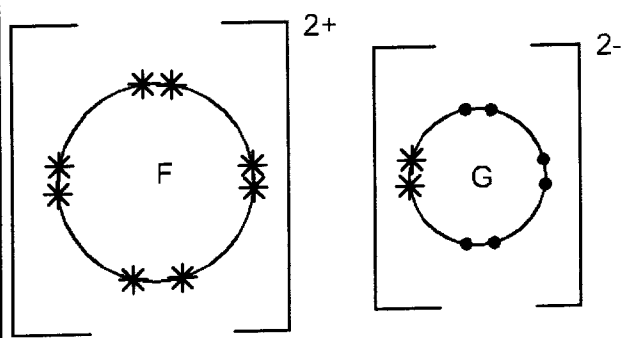
SECTION A – BIOLOGY

1. (a)	<u>Streptococcus pneumonia</u> RJ wrong spelling. Must be underlined separately	(1 mark)
(b)	(i) Internal intercostal muscles contract while external intercostal muscles relax; (ii) Muscles relax and the diaphragm become dome shaped;	(1 mark) (1 mark)
2. (a)	Taxonomy;	(1 mark)
(b)	They belong to different species; leading to a non-viable/infertile offspring;	(2 marks)
3. (a)	A tissue is made up of similar cells; while an organ is made up of different tissues;	(2 marks)
(b)	Cell division; Acc controls cell activities Protein synthesis;	(2 marks)
4. (a)	- All the substrates are broken down; - Produces more energy/ATP than anaerobic respiration;	(2 mark)
(b)	Introduction of a weakened/attenuated/dead disease causing organisms into the body of an individual; to protect the individual from similar infections;	(2 marks)
5. (a)	- Physical exercise; - Low intake of foods rich in cholesterol; (Any 1- 1 mark) acc avoid smoking and alcohol	(1 mark)
(b)	- Increase in humidity; - Decrease in temperature; - Reduction in wind; (Any 2 – 2 marks)	(2 marks)
6.	- Structural compound of cell membrane; - Insulation; - Source of energy; (1 mark each – 3 marks)	(3 marks)
7.	- Increase in temperature towards optimum; - Increase in Carbon (IV) oxide concentration; - Increase/availability of water in the plant;	(3 marks)
8. (a)	Separate the left side of the heart from the right side/ to prevent mixing of oxygenated blood with deoxygenated blood;	(1 mark)
(b)	Diabetes mellitus; RJ diabetes melitus	(1 mark)

9. (a)	<ul style="list-style-type: none"> - Sugar crystals will dissolve/form a solution; - Level of water in the petri-dish will reduce; <p>(Any 1 – 1 mark each)</p>	(1 mark)
(b)	<ul style="list-style-type: none"> - Sugar is hypertonic to the cell sap of the adjacent cells; water in the petri dish moves by osmosis through the potato cells to the sugar crystals hence dissolving them; 	(2 marks)
10. (a)	<ul style="list-style-type: none"> - Shivering to generate heat/contraction and relaxation of skeletal muscles; - Vasoconstriction of superficial blood vessels to prevent loss of heat; - Erector pili muscle contract to make the hair erect and upright to trap air acting as an insulation against heat loss; 	(3 marks)
(b)	<ul style="list-style-type: none"> - Deamination; - Detoxification; - Blood sugar regulation; <p>(Any 2 – 2 marks)</p>	(2 marks)
(c)	<ul style="list-style-type: none"> - Kidney/renal stones; 	(1 mark)

SECTION B - CHEMISTRY

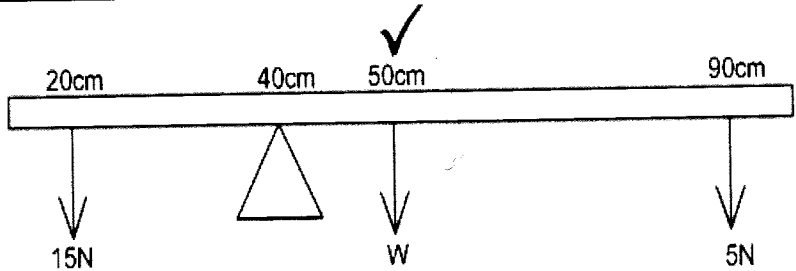
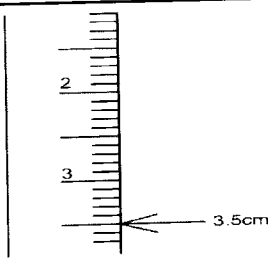
Qn No.	Responses	Marks
11.	 <ul style="list-style-type: none"> - Labelling of nucleus; - Diagram; 	<p>(1 mark)</p> <p>(1 mark)</p>
12.(a)	Pink;	(1 mark)
(b)	<ul style="list-style-type: none"> - Manufacture of the antacid tablets; - Neutralization of the PG of the acidic soil; <p>(any 1 x 1 mark)</p>	<p>(1 mark)</p> <p>(1 mark)</p>
(c)	Water and salt only; (both correct 1 mark)	(1 mark)
13.(a)	A positively charged ion;	(1 mark)
(b)	${}^{23}_{11}\text{Na}$, ${}^{27}_{13}\text{Al}$, ${}^{31}_{15}\text{P}$, ${}^{32}_{16}\text{S}$;	All (2 marks)

Qn No.	Responses	Marks
(c)	Alkaline metals;	(1 mark)
(d)	Ne	(1 mark)
14		(2 marks)
15(a)	Effervescence/bubbles;	(1 mark)
(b)	Hydrogen gas;	(1 mark)
(c)	Lower a burning splint into a gas jar full of gas E, it burns with a 'pop' sound;	(2 marks)
16		(2 marks)
17(a)		(2 marks)
(b)	Ionic bond;	(1 mark)

Qn No.	Responses	Marks
18 (a)	Removal of Ca^{2+} / Mg^{2+} ions from water;	(1 mark)
(b)	Temporary hardness;	(1 mark)
(c)	<ul style="list-style-type: none"> – Causes limescale in kettles and water boilers; – Blockage in hot water pipes; – Wastage of fuel due to coating in kettles and boilers with $CaCO_3$ which makes them become poor conductors; 	(1 mark)
19. (a)(i)	Air/Oxygen/ O_2 ;	(1 mark)
(ii)	Sodium hydroxide/NaOH;	(1 mark)
(b)	Sodium+Oxygen \rightarrow Sodium peroxide ;	(1 mark)
20.	Add water to the mixture and stir to dissolve NaCl; Filter to obtain NaCl solution as filtrate and $PbCO_3$ as the residue; Dry the residue between two filter papers to obtain $PbCO_3$. Evaporate to dryness the filtrate to get NaCl;	(3 marks)
21.(a)	Salt without any replaceable hydrogen ion in its structure;	(1 mark)
(b)(i)	ZnO/Zinc Oxide;	(1 mark)
(ii)	<ul style="list-style-type: none"> – In the hospitals for patients with breathing difficulty; – In welding industries; (any 1 x 1)	(1 mark)

SECTION C – PHYSICS

22.	$0.56 + 10.02 = 10.58$;	(1 marks)
23.	Adhesive forces act between molecules of different kinds while cohesive forces act between molecules of the same kind;	(1 mark)
24.	The chalk dust particles were being hit by the invisible water molecules; setting them into constant random motion;	(2 mark)
25. (a)	i. Water index drops then rises; ii. Glass receives heat and expands first causing the fall; then heat reaches air which expands faster than the glass causing the index to rise;	(1 mark) (2 marks)
(b)	<ul style="list-style-type: none"> - Expands regularly/linearly than alcohol; - Better conductor of heat than alcohol; (Any one) 	(1 mark)

26.	Force acting normally per unit area;	(1 mark)
27.	Metals are better conductors of heat than wood; hence conducts heat faster from the hand causing cooling;	(2 marks)
28.(a)	Metre;	(1 mark)
(b)	The length between any two points;	(1 mark)
(c)	<ul style="list-style-type: none"> - The body starts from rest; - Moves with constant velocity; - Then stops after some time;/zero velocity/comes to rest 	(3 marks)
29.	PE \longrightarrow KE \longrightarrow Sound (PE)	All (2 marks)
30. (a)		(1 mark)
(b)	(Sum of clockwise moment) = ((Sum of anti-clockwise moment); $20 \times 15 = (10 \times W) + (50 \times 5)$ $300 = 10W + 250$ $50 = 10W;$ $W = 5 \text{ N};$	(3 marks)
31.	Friction is reduced on a wet floor; hence sliding occurs;	(2 marks)
32.	Keeping them brighter;	(1 mark)
33. (a)	$e = \frac{F}{K} = \frac{100}{500} = 2\text{cm}$	(2 marks)
(b)		(1 marks)
34.	- Unstable;	(1 marks)
35. (a)	Making it hollow with larger volume to displace more water; for greater up thrust;	(2 marks)
(b)	<ul style="list-style-type: none"> - Large bulb filled with air; - Bulb filled with some lead shots to allow it stand upright; 	(2 marks)

4.8.2 General Science Paper 2 (237/2)

SECTION A: BIOLOGY (34 marks)

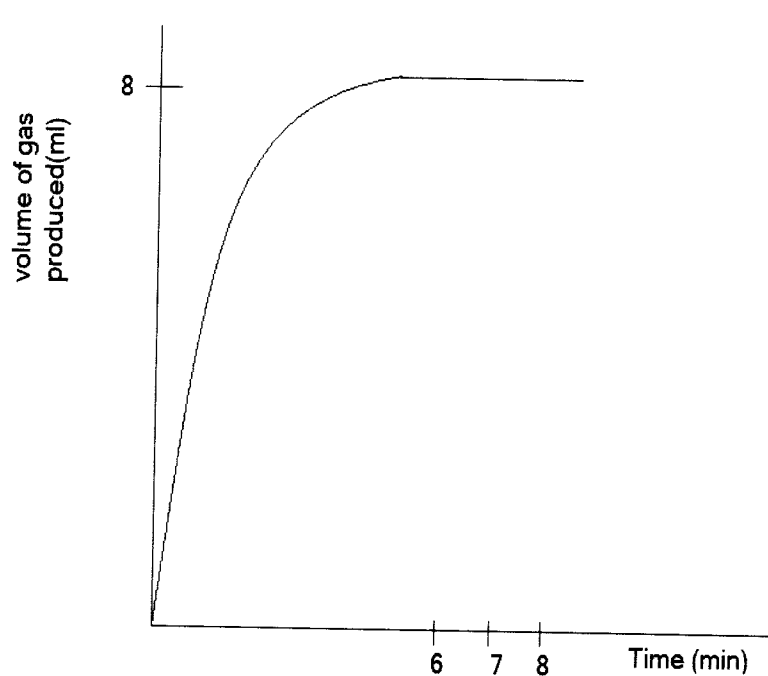
1.	a) Is the gradual change of living organisms from simple life forms to more complex forms over a long period of time; 1 x 1	(1 mark)
	b) Continuous use of antibiotics leads to direct exposure of the disease causing pathogens to the antibiotics hence making them to undergo mutation; (and release enzymes that make the antibiotics harmless/ ineffective) 1 x 1	(1 mark)
2.	(a) Biotic factors; (b) Abiotic factor; 1x2	(2 marks)
3.	<ul style="list-style-type: none"> It provides a frame work for support of the body; Protects delicate internal organs; Provides surface for attachment of muscles; Locomotion/movement; 1x2	(2 marks)
4.	a) 1916;	(1 mark)
	(b) (i) Competition- increased population causes a scramble for resources such as food leading to deaths; (ii) Predation- increased number of predators on the antelope may have led to a decreased population; (iii). Increased human activities e.g. creation of settlements in the plateau which was being inhabited by the antelope; (iv) Disease; (vi) Emigration; 1 x 3	(3 marks)
5.	(a) (i) The gene for albinism was recessive in the parents; the albino offspring resulted from each parent contributing a recessive gene resulting to albino offspring hence homozygosity; 1 x 2 (ii) 25%; 1 x 1	(3 marks)
	(b) Continuous variation are arrange of characteristics among individuals with many intermediates between the 2 extreme ends while discontinuous variations are characteristics which show distinctness and have no intermediates; 1 x 1	(1 mark)
6.	Ball and socket joint allows for movement in all planes, while a hinge joint permits movement in only one direction/plane; 1x1	(1 mark)

7.	<p>(a) Growth is the permanent increase in amount of living matter in an organism, while development refers to the change in body shape, form and complexity due to differentiation of cells; 1 x 1 (1 mark)</p> <p>b) (i) promotes cell division and cell elongation; (in plant/dwarf plant varieties) 1 x 1 (1 mark)</p> <p>(ii) it inhibits the moulting effect on ecdysone hormone hence promoting the nymph development; 1 x 1 (1 mark)</p>	
8.	<ul style="list-style-type: none"> Knowledge of genetics is applied in gene therapy during counseling of couples to prevent possible genetic disorders; Genetics knowledge is applied in the production of hormones/ antibiotics/ vaccines; 1 x 2 (2 marks)	
9.	<ul style="list-style-type: none"> It ensures that there is continuity of a species; hence preventing it from extinction; Sexual reproduction helps in improvement of offspring quality through exchange of genetic material; Reproduction leads to increased number of individuals in a given species which brings about adaptability; First two 1 x 3 (2 marks)	
10.	<p>a) Cotyledon nourishes the germinating seedlings; 1 x 1</p> <p>b) The hardness of the seed coat makes the seed impermeable to water and oxygen required for germination; 1 x 1</p> (2 mark)	
11	<p>a) A conditioned reflex action is a response to a stimulus based on a past experience/learnt experiences; 1 x 1 (2 mark)</p> <p>b) Positive trophic responses e.g. phototropism enabled plants to attain the required resources for survival (e.g. water, light; etc.) 1 x 1 Correct positive tropic responses</p>	
12	<p>a) Ectopic pregnancy; RJ wrong spelling 1 x 1 (4 marks)</p> <p>b) Uterus F - Where implantation of zygote occurs; G - where ovum is produced; 1 x 1 1 x 1</p> <p>c) <u>Treponema pallidum</u> RJ wrong spelling 1 x 1</p>	
13	<p>a) Thigmotropism ; Acc Haptotropism 1 x 1 (1 mark)</p> <p>b) The bending of the tendril is as a result of reduced growth rate on the side of the tendril experiencing the touch stimulus; The reduced growth rate results form a drop in auxin concentration; on the side experiencing the touch stimulus; 1 x 3 (3 marks)</p>	

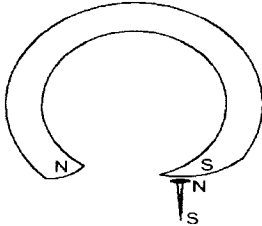
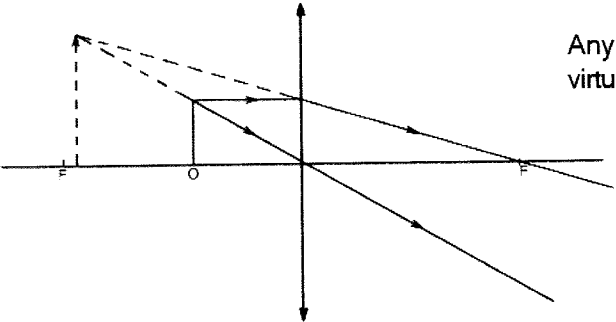
SECTION B - CHEMISTRY

14.	<p>(a) A Hydrogenation 1 ✓ B Combustion 1 ✓</p> <p>(b) (i) $\begin{array}{cc} \text{Br} & \text{H} \\ & \\ \text{H}-\text{C} & -\text{C}-\text{H} \\ & \\ \text{H} & \text{H} \end{array}$</p> <p>(ii) Bromoethane 1 ✓</p>	(4 marks)
15.	<p>(a) Diffusion is the process by which particles spread out from a region of their high concentration to regions of their low concentration. 1 ✓</p> <p>(b) Graham's law states that the rate of diffusion of a fixed mass of gas is inversely proportional to the square root of its density at constant temperature and pressure. 1 ✓</p> <p>(c) The rate of diffusion in gases is faster than that of liquids. ✓ 1 Its particles are less dense thus faster rate of diffusion.</p> <p>OR</p> <p>The rate of diffusion in liquids is slower than that of gases. ✓ 1 Its particles are more dense thus slower rate of diffusion. ✓ 1</p>	(4 mark)
16.	<p>(a) Heat of solution 1 ✓</p> <p>(b) Endothermic 1 ✓</p>	(2 marks)
17.	<p>(a) Molar solution is a solution of a substance containing one mole of substance in one litre solution. ✓ 1</p> <p>(b) $4.0\text{g NaOH} \rightarrow 500\text{cm}^3 \text{ solution}$ $\rightarrow 1000\text{cm}^3 \text{ solution}$</p> $= \frac{4.0 \times 1000}{500} \checkmark \frac{1}{2}$ $= 8.0\text{g} \checkmark \frac{1}{2}$ <p>$40\text{g NaOH} \rightarrow 1 \text{ mole}$ $8.0\text{g NaOH} \rightarrow \frac{8.0 \times 1}{40} \checkmark \frac{1}{2}$ $= 0.2 \text{ moles}$</p> <p>Concentration is $0.2 \text{ moles/litre} \checkmark \frac{1}{2}$ OR 0.2m</p>	(3 mark)

18.	<p>(a) Diamond ✓½ Graphite ✓½</p> <p>(b) (i) To absorb carbon (IV) generated by oxidation of carbon (II) oxide. 1✓</p> <p>(ii) $2\text{CO}_{(g)} + \text{O}_{2(g)} \rightarrow 2\text{CO}_{2(g)}$ 1✓</p> <p>(iii) - Experiment should be carried out in the open in a hood/fume chamber. 1✓ - Gas mask should be used to avoid inhaling the gas. 1✓</p>	(5 marks)
19.	<p>(a) Purifier is used to remove dust/impurities particles from nitrogen and hydrogen gases. 1✓</p> <p>(b) $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightarrow 2\text{NH}_{3(g)}$ 1✓</p> <p>(c) Iron</p>	(3 mark)
20.	<p>(a) Bauxite 1✓</p> <p>(b) (i) P Anode 1✓ Q Cathode 1✓</p> <p>(ii) Oxygen gas 1✓</p> <p>(c) - Making overhead cables ✓ - Making cooking vessels ✓ - Aluminium alloy with magnesium used to make parts of aeroplane. ✓ - As a reducing agent in the thermite process. ✓</p>	(5 marks)
21.	<p>(a) $\text{Zn}_{(s)} + 2\text{HCl}_{(aq)} \rightarrow \text{ZnCl}_{2(aq)} + \text{H}_{2(g)}$ 1✓</p>	(4 mark)

	<p>(b)</p>  <p>(c) All the hydrochloric acid had been used up in the reaction hence no further gas was being produced. 1✓</p> <p>(d) Grind the zinc granules into fine powder to increase the surface area. ✓1</p>	
22.	<p>(a) Use in a well ventilated area to avoid inhalation of carbon (II) oxide which is poisonous. ✓1</p> <p>(b) - Unburnt hydrocarbons contribute to global warming. ✓1 - Produces poisonous gases such as carbon (II) oxide. ✓1</p>	(3 marks)

SECTION C: PHYSICS (33 marks)

23	Magnification is the ratio of image height to object height	(1 marks)
24	The ebonite is negatively charged/has similar charge as the sphere	(1 marks)
25	a) Positive electrode	(1 marks)
	b) Increase area of reaction of the positive electrode	(1 marks)
	c) Act as a depolarizer	(1 marks)
26		(1 marks)
27	a) 0.01 s	(1 marks)
	b) 1 cm	(1 marks)
28	– Sound is a mechanical wave it <u>requires a medium of transmission</u> . <u>When air is pumped out a vacuum is created</u> hence transmission of sound does not occur.	(2 marks)
29	Voltmeter reading = 3V	(1 marks)
30	 <p>Any two rays = 1 mark each virtual image = 1 mark</p>	(3 marks)
31	<ul style="list-style-type: none"> Resistance of the coil Current Time <p>(any 2)</p>	(2 marks)
32	a) To <i>reduce/minimize power loss</i> since they have <i>lower resistance</i>	(2 marks)
	b) For <i>safety of the user</i> and the device in case <i>live wire gets in contact with the surface of the iron box</i>	(2 marks)

33	a) K - Cathode	(1 marks)
	b) L = Anode: Accelerate/direct the cathode rays to the screen	(1 marks)
	c) Z – Grid: Control intensity of electrons reaching the screen by being more negative or less negative with respect to the anode.	(1 marks)
34	a) Increase heater current	(1 marks)
	b) -Detecting cracks in metal castings -Sterilization of surgical equipment	(1 marks)
	c) They are not charged	(1 marks)
35	$\frac{32}{2}g\sqrt{-\frac{16}{2}g\sqrt{-8g\sqrt{-\dots}}}$ 4 days = 2 half lives	(3 marks)
36	By <i>doping it with trivalent atoms</i> . The <i>three atoms form covalent bonds but one is left unbounded</i> hence <i>holes are left hence accepts an electron</i> to complete the bond	(3 marks)
37	Sound waves	(1 marks)