

**KENYA NATIONAL EXAMINATION COUNCIL  
KCSE 2012**

**GENERAL SCIENCE PAPER 2  
Marking Scheme**

**SCHOOLS NET KENYA**  
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**5.5.2 General Science Paper 2 (237/2)**

**SECTION A: BIOLOGY**

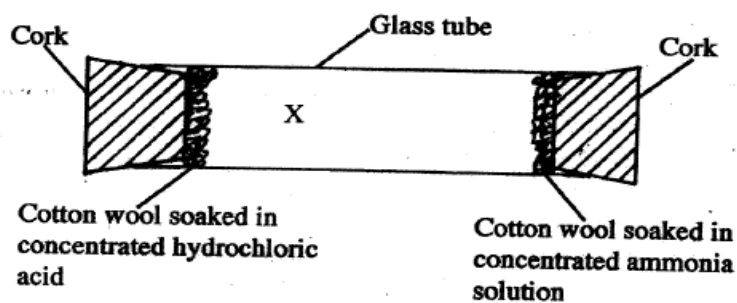
1. (a) Q - Animals;  
R - Ammonia/NH<sub>4</sub>;  
S - Nitrates; (3 marks)
- (b) Nitrogen fixation; (1 mark)
- (c) Fungi/saprophytic organisms; Bacteria;  
(any one correct) (1 mark)
2. (a) (i) Produce ova; produce hormones;  
(any one correct) (1 mark)
- (ii) Temporary storage of sperms;  
place where 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; (2 marks)  
(first two correct)
- (b) Packing; mechanical support; (1 mark)  
(first one correct)
9. (a) Attachment of zygote to the wall of the uterus; (1 mark)
- (b) Avoid indiscriminate sex/kissing; (2 marks)  
Avoid sharing of needles and syringes;
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)

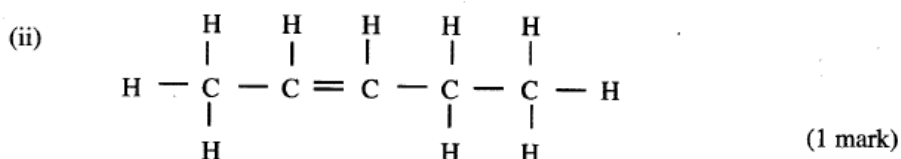
12.  $\text{CaCO}_3 \checkmark = 40 + 12 + 48 = 100 \checkmark$

$$\frac{0.1 \times 100}{1} = 10 \text{g} \checkmark \quad (2 \text{ marks})$$

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". (½ 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.  $\sqrt{1/2}$  (1½ 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).

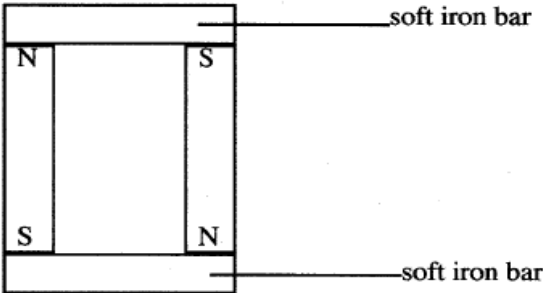
But-1-ene turns acidified potassium dichromate (VI) from orange to green but remains orange with butane.

- (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.

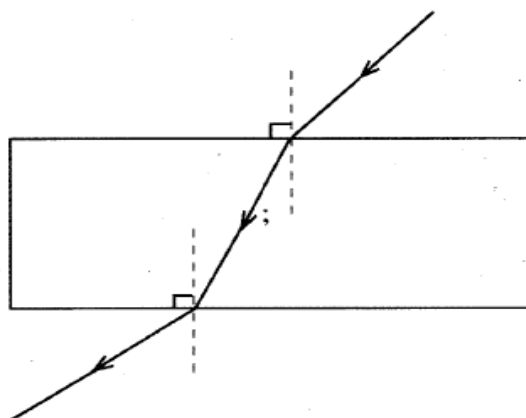
- Used to soften hard water. (Any two correct) (1 marks)
16. (a) the reaction is exothermic. (1 mark)
- (b) The equilibrium will shift to the right since the volume of product is less than that of reactants. (2 marks)
- (c)
  - Purifying petroleum products
  - Manufacture of sulphuric (VI) acid
  - Bleaching 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)  $C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$  (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 =  $(23 \times 2) + 32 + (16 \times 4)$   
 $= 46 + 32 + 64 = 142 \checkmark \frac{1}{2}$   
 $= \frac{142}{142} = 1 \text{ mole } \checkmark \frac{1}{2}$
- 500cm<sup>3</sup> contains 1 mole  
 1000cm<sup>3</sup> would contain ?
- $\frac{1000}{500} \times 1 \checkmark \frac{1}{2}$   
 $= 2 \text{ M } \checkmark \frac{1}{2}$  (2 marks)
- (b)  $M_1 V_1 = M_2 V_2$   
 $2 \times V_1 = 0.5 \times 1000 \checkmark \frac{1}{2}$   
 $V_1 = \frac{0.5 \times 1000}{2} \checkmark \frac{1}{2} = 250 \text{ cm}^3 \checkmark$  (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  
 Image height = 0.5 x object height  
                   = 0.5 x 24 cm;  
                   = 12 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.  (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)

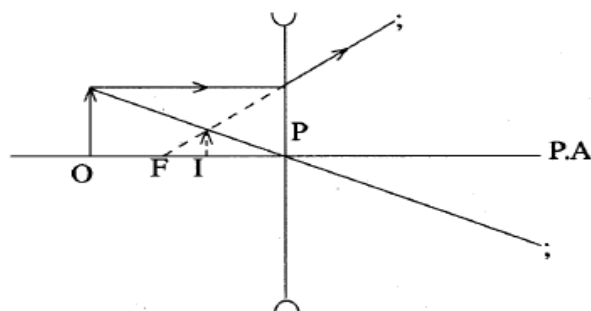
9.



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

(2 marks)

10.



Ray from O parallel to P.A 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)