GENERAL SCIENCE PAPER 2

ANSWERS

KCSE 2011

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BIOLOGY

SECTION A: (34 marks)

1. (a) Air; moisture;salinity; P^H; temperature; any two. (2 x 1) (2 marks)

   (b) Ticks on buffaloes/tse-tse flies on water bucks/ fleas on monkeys; accept any other correct relationship. (1 x 2) (2 marks)

2. (a) Pass hereditary characteristics to future generations;
   Perpetuate the species/survival;
   Continuation of life
   Natural selection/enhances variations; any two. (2 x 1) (2 marks)

   (b) Fertilization - fusion of sperm and egg to form zygote while ovulation is the release of the ovum from the ovary into the fallopian tube; (mark as a whole) (1 mark)

   (c) Testosterone; (1 mark)

3. (a) Decomposition/decay; (1 mark)

   (b) Long/fibrous roots; for anchorage in /absorption of nutrients from water. (1 mark)

   (c) By converting pollutants to harmless substances; accept recycling. (1 mark)

4. (a) Fast/rapid/exponential growth; many cells are dividing/optimum environmental conditions; (2 marks)

   (b) A period during which a viable seed undergoes no growth; (1 mark)

   (c) Lateral buds sprout; due to reduced supply of auxins; (2 marks)

   (d) A period during which a seed does not germinate even if in favourable conditions.

5. (a) The man produces two types of sperms one containing X chromosomes and the other Y chromosomes; while the woman produces ova with only X chromosomes; If the X sperm fertilizes the ovum the result is a girl and if the Y sperm fertilizes the ovum the result is a boy; (maximum two marks). (2 marks)

   (b)

Parental	Rr		rr;
Genoty			
Meiosis			
Gametes			;
Fertilization			
F1 Genotype			
F1 Phenotype	Red-eyed		White-eyed
F1 Phenotypic ratio	1	:	1

(3 marks)

Red eyed : White eyed

(c) Phenotypic ratio 1 : 1 (1 mark)

6. Avoid sharing contaminated equipments and clothing; Abstinence; protected sex; Being fai to uninfected partner. (any two) (2 m

7. Completely cure the disease;
Prevent resistance to the medicine;
Prevent overdoes/organ damage/death;
Avoid weakening of immune system; (any two) (2 m

8. (a) Parenchyma/ sclerenchyma/
Xylem/ collenchyma;/ (any correct two) (1 r

(b) Knee joint/elbow joint; (1

9. (a)

Nervous system	**Endocrine system**
- message as electrical impulses	- message in form of chemicals
- Transmitted within nerves	- transmitted in blood
- Rapid	- slow
- Effects specific	- Effects generalised/diffused

(any two correctly contrasted) (2 m

(b) (i) pinna: collect sound waves/direct sound waves into the external auditory (1

(ii) ossicles: Amplify sound vibrations/transmit sound vibrations to the inner e (1

10. (a) Relay/connect/intermediate neurone; (1

(b) Presence of many dendrites from the cell body in all directions/has no myelin shea (1

SECTION B

CHEMISTRY: (33 marks)

11.

	R.F.M
H_2O	$2(1) + 16 = 18$
CO_2	$12 + 2(16) = 44$
N_2	$(14)\,2 = 28$
O_2	$(16)\,2 = 32$
NH_3	$14 + 3(1) = 17$

or

CO_2 will difuse with slowest rate (1)
Since it has the largest molecular mass (44g) (½) (2 mar

12. H_2O $2(1) + 16 = 18$

Hatoms has 2 moles in 18g (½)

x moles in 3.6g

$` 2\# 3.6 = 18x$

$x = \frac{2 \# 3.6}{18} = 0.4$ moles of H atoms

(2 marks)

13. (a) Fermentation is a process in which cane sugar substances is converted into ethanol and carbon (IV) oxide (1) in absence of oxygen. (1)

(b) Distillation. (1)

(c) Fuel, solvent, pharmaceutical, Chromatography, cosmetics. (1) (4 marks)
- Preparation of Esters, Ethene, Ethanoic
- As an antiseptic (Any one)

14. (a) Plotting (1)
scale (1)
curve (1) (If graph is inverted maximum 2)

(b) $0.4cm^3$ per second (1) (4 marks)

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scale (1)
curve (1) (If graph is inverted maximum 2)

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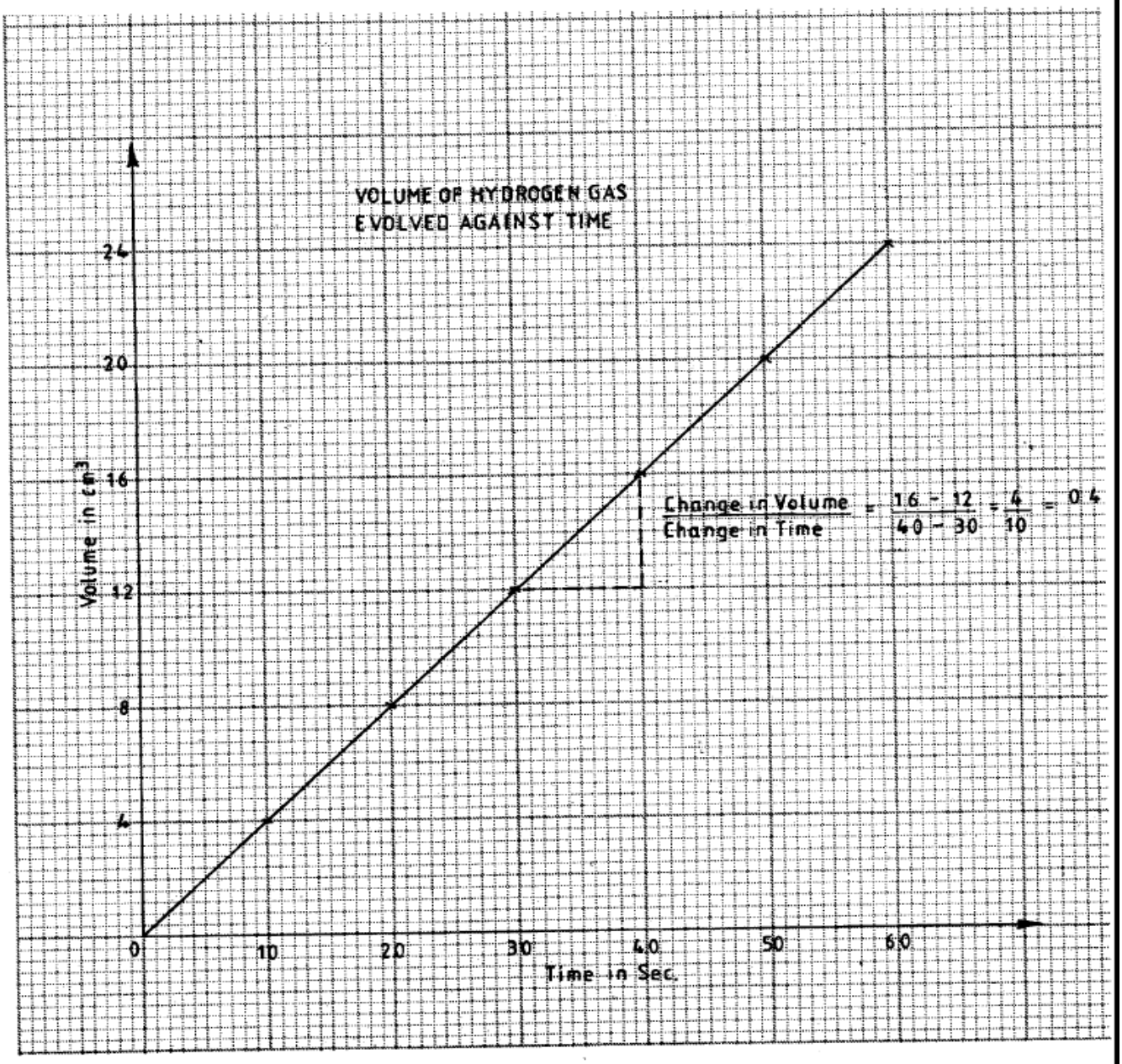
VOLUME OF HYDROGEN GAS EVOLVED AGAINST TIME



15. (a) Cracking Hydrocarbons/electrolysis of acidulated water/electrolysis of Brine.
Water gas (any one) (1 mark)

(b) Increasing pressure increases yield of ammonia. (1)
4 volumes of reactants against 2 volumes of products; hence increase in pressure raises the volumes of products. (1)

(c) Manufacture of nitric(V) acid explosives, nylon & plastics. (any one) (1).
(4 marks

16. (a) Aluminium is a reactive metal. (1)

(b) N is made from carbon electrodes which react with oxygen evolved, forming CO_2, (1)
Hence requires to be replaced regularly.

(c) Lower the melting point of bauxite. (1)

(d) It has a low density (1) and a good conductor of electricity.(1)

(5 marks)

17. (a) Is a solution that contains one mole of a substance per litre. (1)

(b) 6.24g of $CuSO_4.5H_2O$ contains $\frac{6.24}{249.5} = 0.025$ moles

$250cm^3$ of solution contains 0.025 mole

$1000\ cm^3$ contains $\frac{1000}{250} \# 0.025$

$= 4 \# 0.025$

$= 0.1$ moles

Molarity of the solution is 0.1M (3 marks)

18. (a) A endothermic reaction. $\frac{1}{2}$
heat is absorbed. $\frac{1}{2}$

B exothermic reaction $\frac{1}{2}$
heat is evolved.

(b) It does not support burning (1)
It is denser than air (1)

(c) biogas is clean, (no smoke); firewood produce more smoke. (any 1)
conservation of forest.
heat value of biogas is high.
No residue in biogas after burning while in firewood ash remains. (5 marks)

19. Under the same conditions of temperature and pressure, the rate of diffusion of a gas is inversely proportional to the square root of its density. (1) (1 mark)

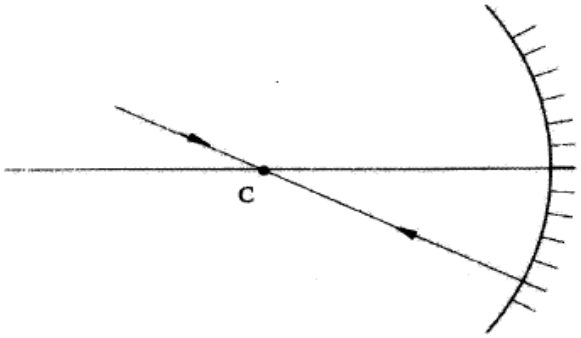
20. (a) Upward displacement of air or downward delivery.(1)

(b) Chlorine is denser than air.

(c) Water treatment/treatment of sewerage.
Manufacture of PVC.
$CFCs/CCl_4/CHCl_3$. any two $\surd$ 1 mark
As a bleaching agent. (3 marks)

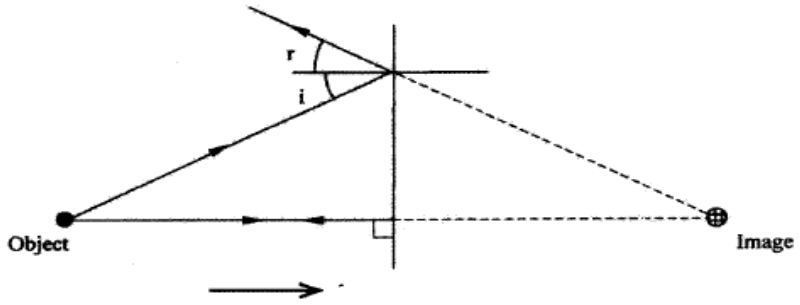
SECTION C
PHYSICS: (33 marks)

21. (a)



(1 mark

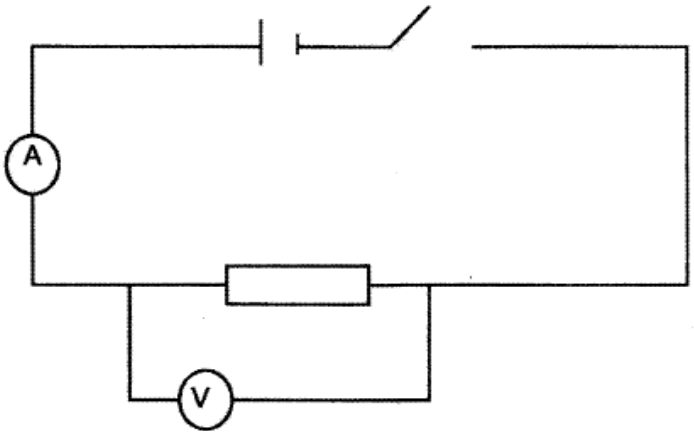
22.



(1 mark

23. On rubbing electrons leave the cloth and accumulate on the plastic ruler. (1 mark
The ruler becomes negatively charged while the cloth is left with a net positive charge.

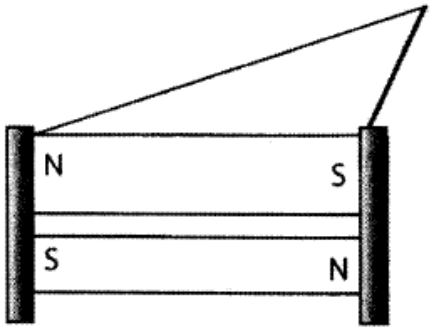
24. (1 mark



Position of ammeter (1 mark)

Position of voltameter (1 mark)

25. (1 mark)



26. (a) a = 10cm (1 mark)

(b) λ = 20cm (1 mark)

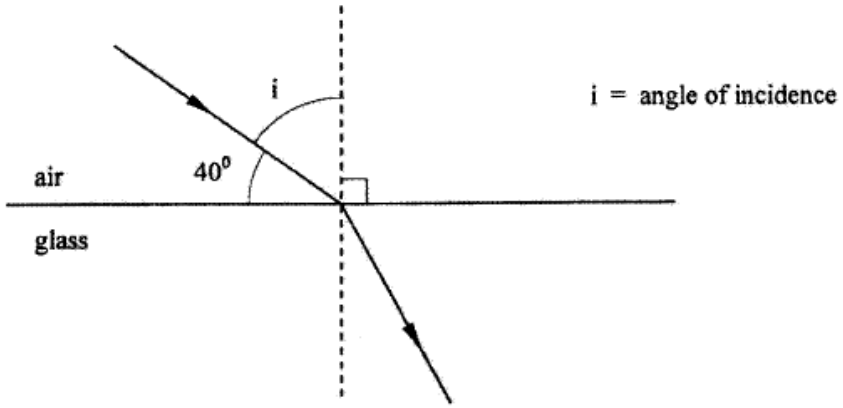
27. Distance = speed x time (1 mark

$= 340 \times \frac{0.4}{2}$ (1 mark

= 68m

28. I = 0.35A (1 mark)

29. (a) (1 mark



(b)

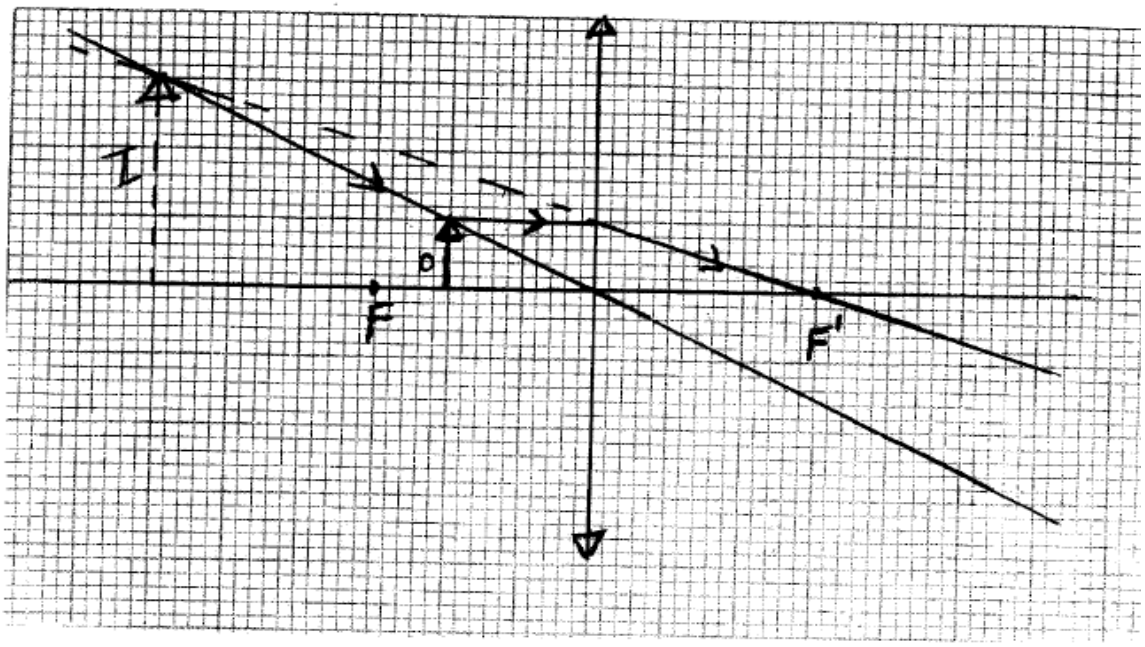
$$n = \frac{\sin i}{\sin r}$$

$$1.5 = \frac{\sin (90 - 40)^{\circ}}{\sin r}$$ (1 mark)

$$\sin r = \frac{\sin 50}{1.5} = \frac{0.766}{1.5} = 0.5106$$

$$r \simeq 30.71^{\circ}$$ (1 mark)

30.



31.

$$P = VI$$

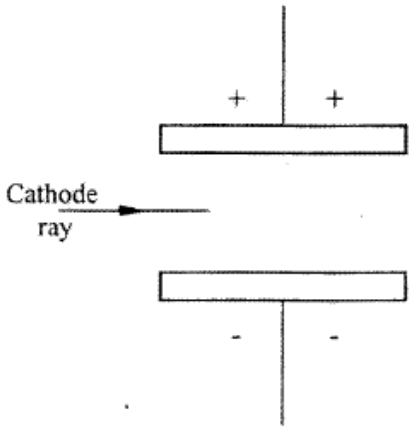
$$= \frac{V^2}{R};$$

$$= \frac{240 \times 240}{20};$$

$$= 2880 \text{ watts}$$

32. (a) to minimize collisions between cathode rays and air molecules;
to minimise reduction of KE of the cathode rays;
to reduce ionization of air molecules.

(b)

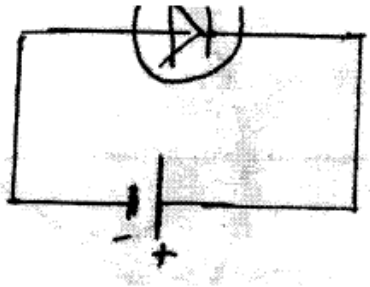


33. higher frequency x - rays are produced more penetrating x-rays/hard x-rays/Higher energy/ x-rays/High quality x-rays.

34. - used in treatment of cancer;
- used to sterilize medical equipment;
- used in detecting abnormal tissue in people. (any two 1 mark each) (2 mark

35. (a) conduction in semiconductors is by electrons and holes while in conductors it is by electrons.
conductivity of a semiconductor increases with increase in temperature while that of a conductor decreases with increase in temperature. (any 1 correct) (1 mar

(b)



36. From the graph,
Mass at t = 0 is 80g;
time when mass is 40g; is 2.25 minutes.
∴ half life period is 2.25 minutes

or 1 mark for reading off values of mass reducing by half .

1 mark for the time taken for mass to reduce to half the original.