Name:..... **Index No:...../.....**

237/2
GENERAL SCIENCE
Paper 2
Oct./Nov. 2011
2½ hours

Candidate's Signature:.....

Date:.....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
GENERAL SCIENCE
Paper 2
2½ hours

Instructions to candidates

1. *Write your name and index number in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *This paper consists of **three** sections: **A**, **B** and **C**.*
4. *Answer **all** the questions in sections; **A**, **B** and **C**.*
5. ***All** answers must be written in the spaces provided.*
6. ***This paper consists of 18 printed pages.***
7. ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 - 10	34	
B	11 - 20	33	
C	21 - 36	33	
		Total Score	

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SECTION A: BIOLOGY (34 marks)

*Answer **all** the questions in the spaces provided.*

1 (a) Name **two** abiotic factors in a soil ecosystem. (2 mark)

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(b) Give an example of parasitism in wood-land ecosystem. (2 marks)

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.....

2 (a) State **two** reasons for sexual reproduction in animals. (2 marks)

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(b) Distinguish between fertilization and ovulation. (1 mark)

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(c) Name the hormone that is responsible for the growth of beards. (1 mark)

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.....

3 (a) State **one** role played by both bacteria and fungi in nitrogen cycle. (1 mark)

.....

(b) Give **one** adaptation of hydrophyte roots. (1 mark)

.....

(c) Name a method that can be used to control air pollutants from a factory. (1 mark)

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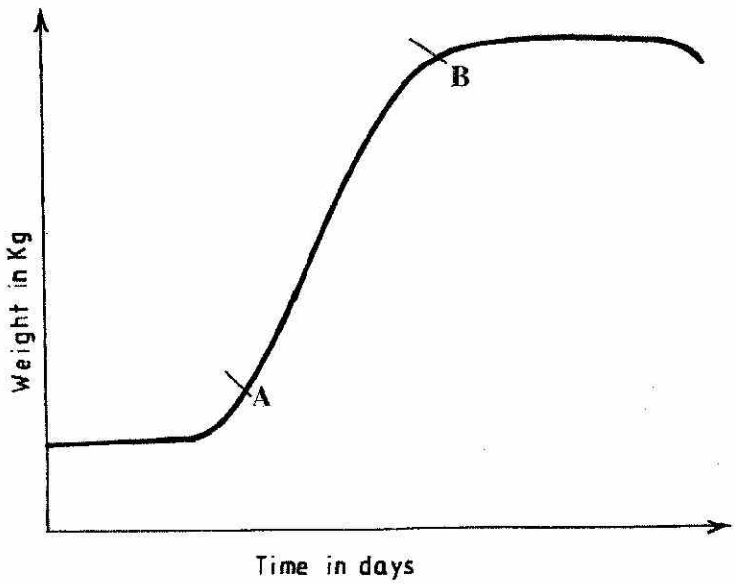
4 The graph below illustrates growth in an animal.



(a) Explain what happens between points **A** and **B**. (2 marks)

.....

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(b) What is meant by the term seed dormancy? (1 mark)

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(c) Explain what happens when the shoot apex of a plant is removed. (2 marks)

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5 (a) Explain how the sex of a child is determined by a man. (2 marks)

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(b) A heterozygous red-eyed fruit fly was crossed with a recessive white-eyed one. Using 'R' to represent the dorminant gene, work out the cross to show the offspring. (3 marks)

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(c) State the phenotypic ratio of the offspring. (1 mark)

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6 State **two** ways in which sexually transmitted infections can be avoided. (2 marks)

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7 Explain the importance of strictly following the prescription given when taking medicine. (2 marks)

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8 (a) Name **two** supportive tissues in dicotyledonous plants. (1 marks)

.....

(b) Give an example of a hinge joint in humans. (1 mark)

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9 (a) State **two** differences between the endocrine and the nervous systems. (2 marks)

.....

.....

(b) State **one** function for each of the following structures in the mammalian ear.

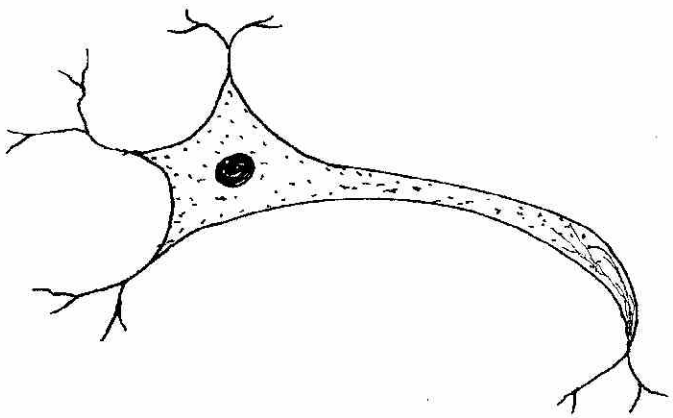
(i) pinna (1 mark)

.....

(ii) ossicles (1 mark)

.....

10 The diagram below represents a type of neurone found in animals.



(a) Name the neurone. (1 mark)

.....

(b) Give the reason for your answer in (a) above. (1 mark)

.....

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SECTION B: CHEMISTRY (33 marks)

*Answer **all** the questions in this section in the spaces provided.*

11 Under the same conditions of temperature, volume and pressure, which one of the following gases; steam, carbon(IV) oxide, nitrogen, oxygen and ammonia would diffuse the slowest? Explain. (R.A.M: H = 1, C = 12, N = 14 and 0 = 16). (2 marks)

.....

.....

.....

12 Hydrogen combines with oxygen to form water. How many moles of hydrogen atoms does 3.6g of water contain? (2 marks)
(H = 1, O = 16)

.....

.....

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13 One of the methods used for large scale production of ethanol is by fermentation of cane sugar.

(a) What is meant by fermentation? (2 marks)

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.....

(b) The ethanol obtained is about 4 - 8% concentrated. How can this concentration be increased? (1 mark)

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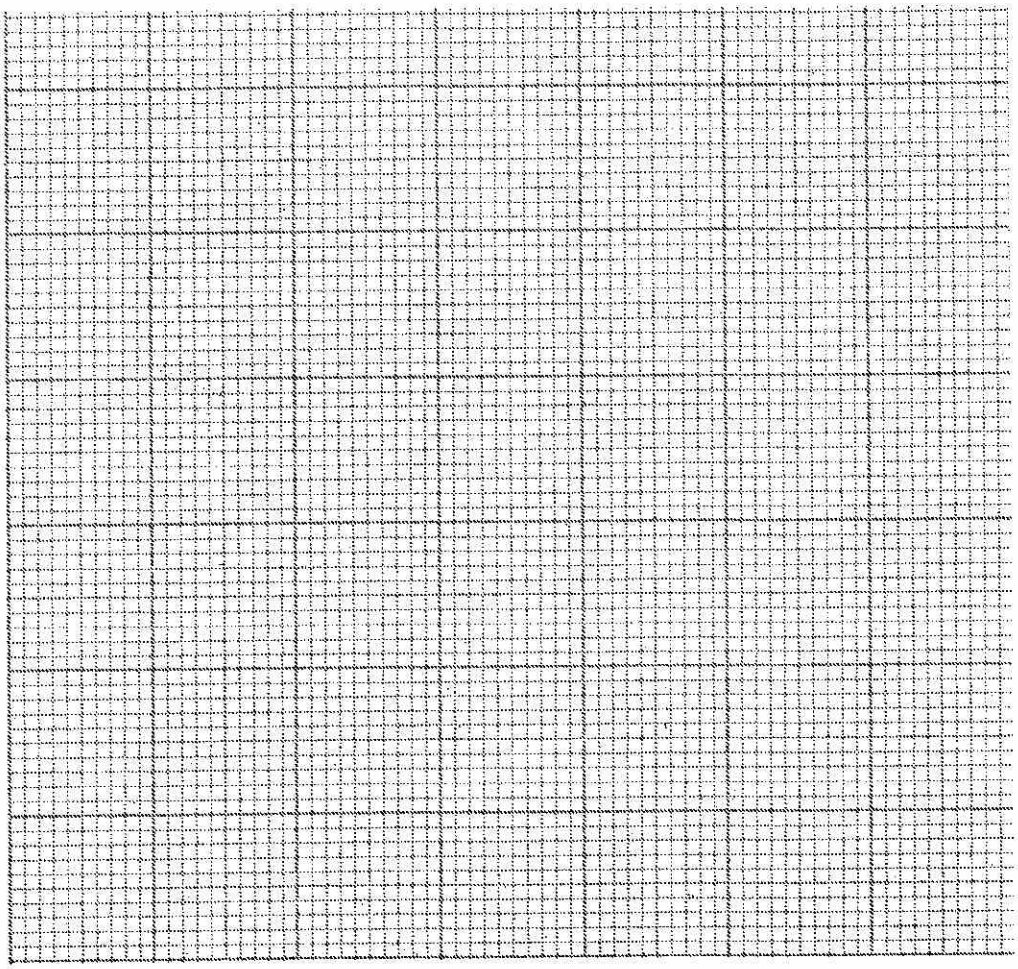
(c) Other than being used as an alcoholic beverage, state one use of ethanol. (1 mark)

.....

14 Dilute hydrochloric acid was reacted with magnesium ribbon and the volume of hydrogen gas evolved was measured at 10 seconds interval up to 60 seconds. The volumes were recorded as in the table below.

Time in seconds	0	10	20	30	40	50	60
Volume of hydrogen in cm^3	0	4	8	12	16	20	24

(a) Using the grid provided draw a graph of volume of hydrogen (vertical axis) against time (horizontal axis). (3 marks)



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(b) Using the graph, determine the average rate of production of hydrogen. (1 mark)

.....

.....

15 In the manufacture of ammonia using the haber process, nitrogen and hydrogen gases react as shown in the equation below.

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$$

(a) State the source of hydrogen gas. (1 mark)

.....

(b) Explain the effect of increasing pressure on the yield of ammonia. (2 marks)

.....

.....

(c) Give **one** use of nitrogen (IV) oxide. (1 mark)

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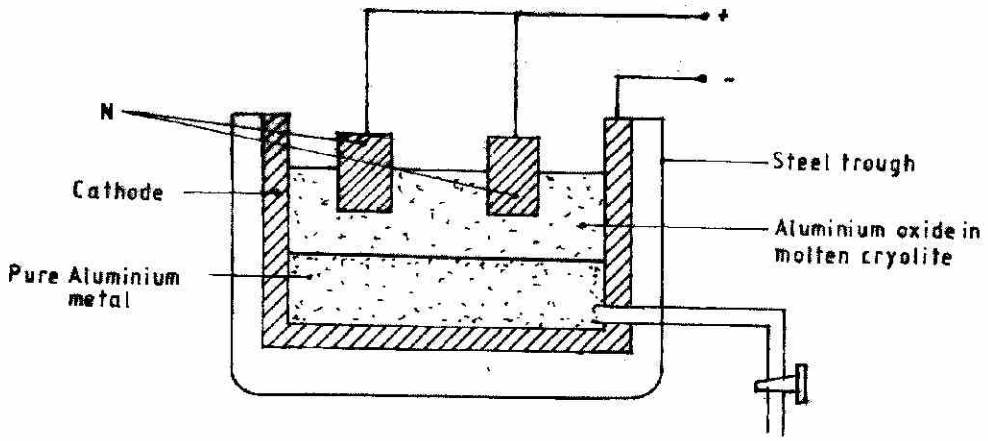
16 The diagram below represents electrolytic production of aluminium metal. Study it and answer the questions that follows.



(a) Why is aluminium extracted by electrolysis and not reduction? (1 mark)

.....

(b) Why is N replaced regularly? (1 mark)

.....

(c) State **one** use of the molten cryolite in the above process. (1 mark)

.....

(d) State **two** properties that makes aluminium metal to be widely used in electric cables. (2 marks)

.....

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17 (a) What is meant by the term molar solution? (1 mark)

.....

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(b) Calculate the molarity of a solution containing 6.24g of hydrated copper (II) sulphate crystals in 250cm^3 of solution. (R.F.M $CuSO_4.5H_2O = 249.5$). (2 marks)

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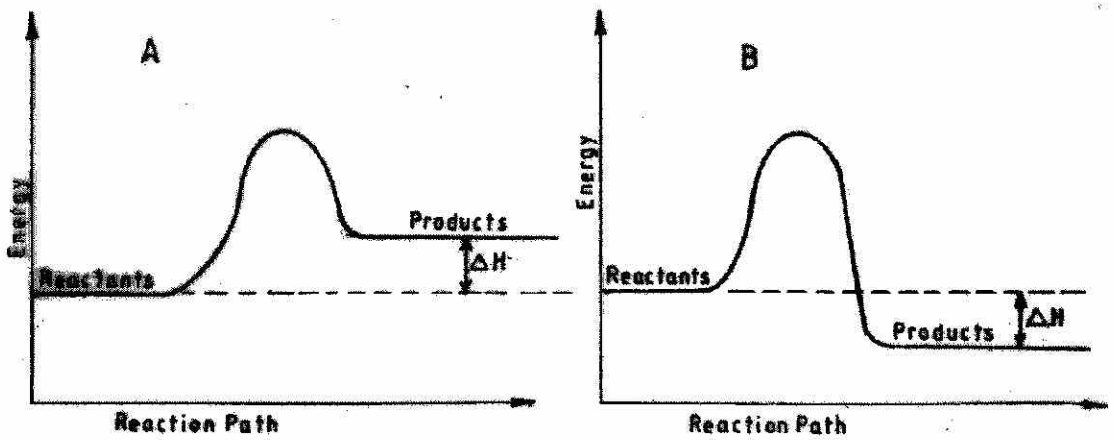
18 The energy level diagrams below shows the enthalpy changes for reactions A and B.



(a) State with a reason the type of reactions represented by A and B. (2 marks)

A .....

B .....

(b) State **two** properties of carbon (IV) oxide that make it qualify to be used as a fire extinguisher. (2 marks)

.....

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(c) Give **one** advantage of using biogas as a fuel instead of firewood. (1 mark)

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19 State Graham's law of diffusion. (1 mark)

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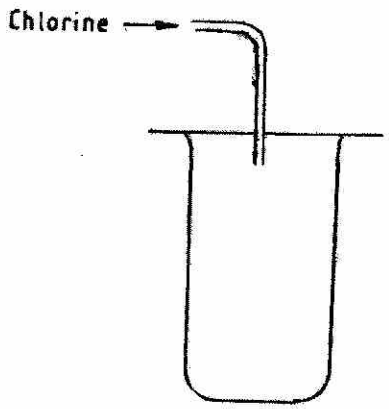
20 Chlorine gas is collected using the method shown in the figure below.



(a) Name the method of collection. (1 mark)

.....

(b) Which property of chlorine enables it to be collected using the method shown above? (1 mark)

.....

(c) Give **two** uses of chlorine gas. (1 mark)

.....

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SECTION C - PHYSICS (33 marks)

*Answer **ALL** the questions in this section in the spaces provided.*

21 (a) **Figure 1** shows a ray of light incident on a converging mirror through the centre of a curvature C.

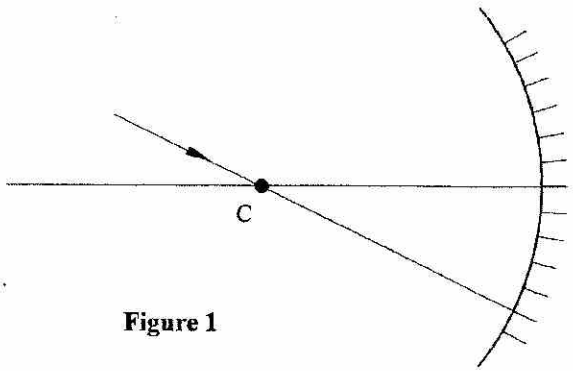

Figure 1

Complete the diagram to show the reflected ray. (1 mark)

22 **Figure 2** shows two rays from a point object O incident on a plane mirror

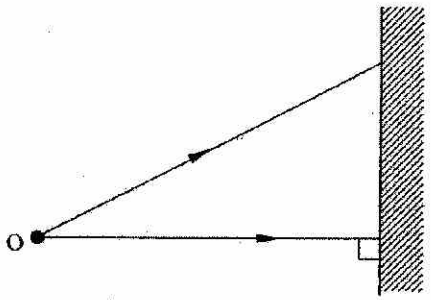

Figure 2

Complete the diagram to show the position of the image. (2 marks)

23 A plastic ruler becomes negatively charged when rubbed with a piece of cloth. Explain how the ruler acquires the charge. (2 marks)

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24 Given a voltmeter, an ammeter, a resistor, a switch and a cell, draw a circuit diagram that may be used to measure the voltage across the resistor and the current through it. (2 marks)

25 Draw a labelled diagram showing how two bar magnets should be stored using keepers. (1 mark)

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26 **Figure 3** shows a graph of displacement against distance for a wave in a medium.

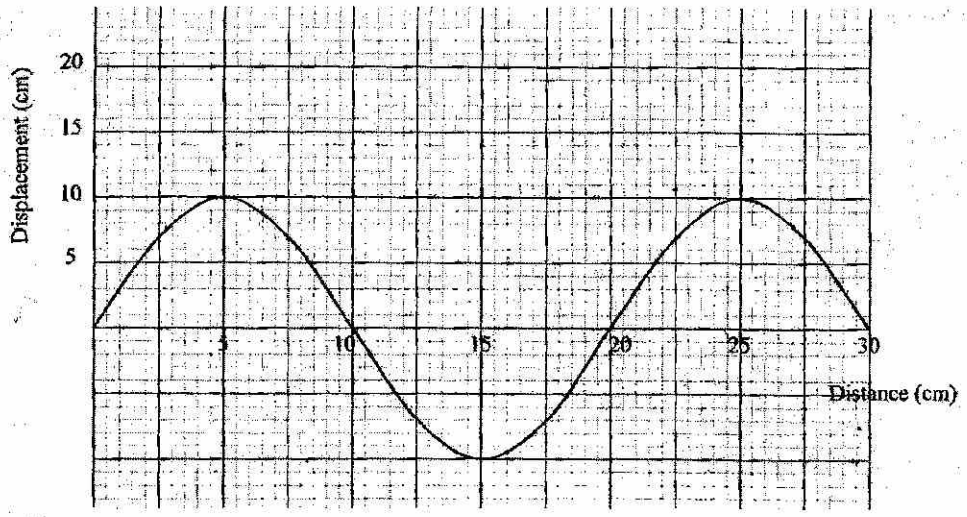

Figure 3

Determine:

(a) the amplitude of the wave, (1 mark)

.....

.....

(b) the wavelength of the wave. (1 mark)

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.....

27 A girl standing in front of a wall claps her hands. She hears the echo 0.4 seconds later. Determine the distance between the girl and the wall.
(take speed of sound in air to be $340ms^{-1}$) (3 marks)

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28 **Figure 4** shows the face of an ammeter indicating a current.

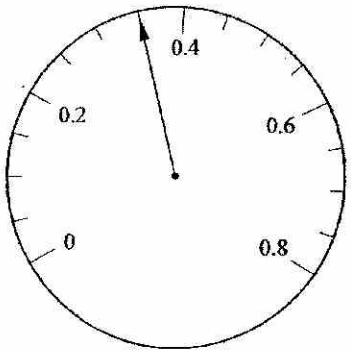

Figure 4

State the value of the current indicated. (1 mark)

.....

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29 **Figure 5** shows a ray of light travelling from air to glass.

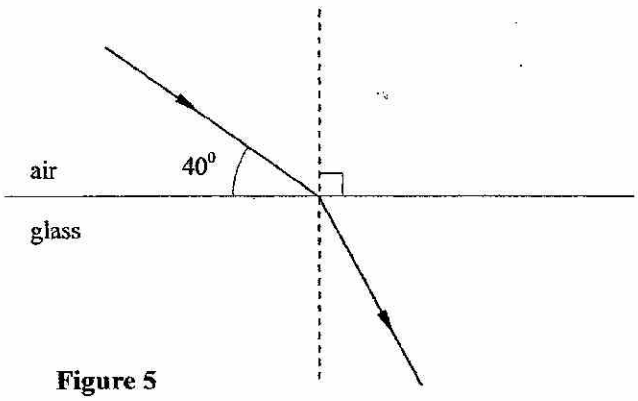

Figure 5

(a) Indicate on the diagram the angle of incidence, of the ray. (1 mark)

(b) Given that the refractive index for a ray travelling from air to glass is 1.5, determine the angle of refraction. (2 marks)

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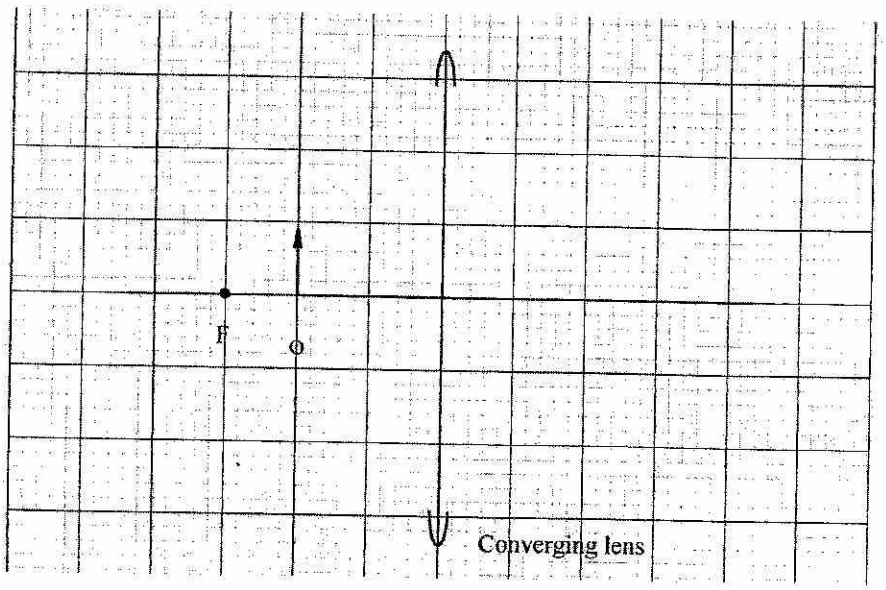
30 **Figure 6** shows an object O placed in front of a converging lens whose principal focus is F.



Draw a ray diagram to locate the image formed. (3 marks)

31 An electric cooker has a resistance of 20Ω. Determine the power it dissipates when connected to a 240V mains supply. (3 marks)

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32 (a) State the purpose of creating a vacuum in a cathode ray tube. (1 mark)

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(b) **Figure 7** shows a horizontal cathode ray entering an electric field between two charged plates.

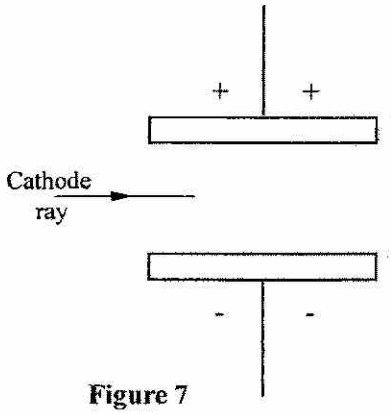

Figure 7

Complete the diagram to show the path of the ray in the electric field. (1 mark)

33 State how the produced X-rays change, when the anode potential of the X-ray tube is increased. (1 mark)

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34 Name **two** medical uses of radioactive radiations. (2 marks)

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35 (a) State **one** difference between a semiconductor and a conductor. (1 mark)

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(b) Draw a circuit diagram to show a diode connected in the reverse bias mode

(1 mark)

36 **Figure 8** shows a graph of mass against time for a radioactive sample.

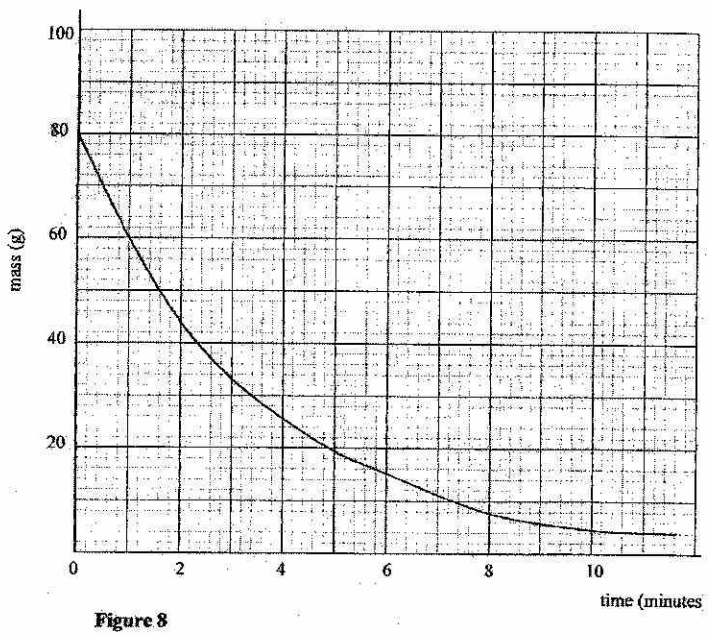

Figure 8

Use the graph to determine the half life of the sample. (2 marks)

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