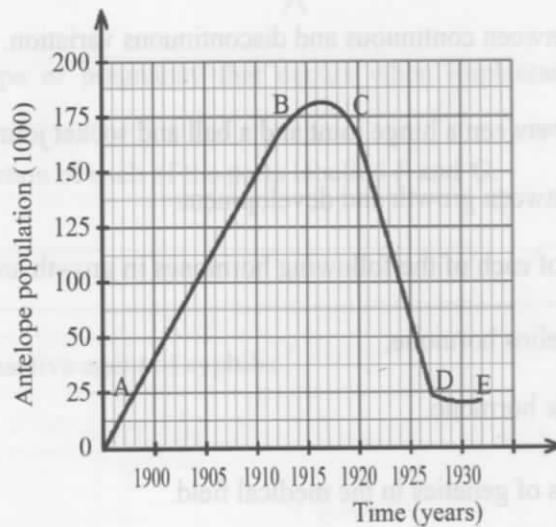


3.8.2 General Science Paper 2 (237/2)

SECTION A: BIOLOGY (34 marks)

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

1. (a) Define the term evolution. (1 mark)
(b) Explain how prolonged use of antibiotics leads to resistance by disease causing organisms. (1 mark)
2. Classify each of the following factors as biotic or abiotic.
(a) Human activities (1 mark)
(b) Soil texture (1 mark)
3. State two roles of an endoskeleton in mammals. (2 marks)
4. Below is a graphical representation of the change in antelope population in Nairobi National Park over a period of 30 years.

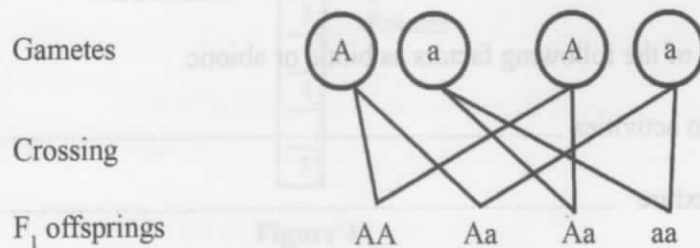


- (a) In which year was the antelope population highest? (1 mark)
- (b) Explain three biotic factors that may have caused the change in antelope population between C and D. (3 marks)

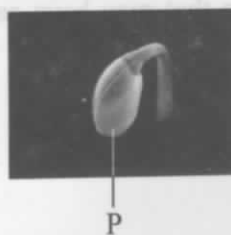
5. The following are results of a genetic cross between a couple illustrating inheritance of albinism.

Parental phenotype : Normal Male X Normal Female

Parental genotype : Aa X Aa

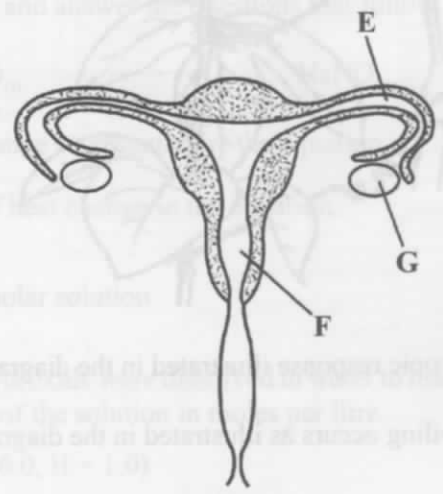


- (a) (i) Explain why one of the offspring was an albino yet none of the parents was. (2 marks)
- (ii) What percentage of their children are likely to be albinos? (1 mark)
- (b) Distinguish between continuous and discontinuous variation. (1 mark)
6. State **one** difference between a hinge joint and a ball and socket joint. (1 mark)
7. (a) Distinguish between growth and development. (1 mark)
- (b) State the role of each of the following hormones in growth and development:
- (i) Gibberelins hormone; (1 mark)
- (ii) Juvenile hormone. (1 mark)
8. State **two** applications of genetics in the medical field. (2 marks)
9. State **two** reasons why reproduction is important in living organisms. (2 marks)
10. The diagram below shows a germinating bean seed.



- (a) State the function of the part labelled P. (1 mark)

- (b) State how a seed coat causes seed dormancy. (1 mark)
- 11. (a) State the meaning of conditioned reflex actions. (1 mark)
- (b) State the importance of tropic responses to plants. (1 mark)
- 12. The diagram below illustrates a section of a female reproductive system. (2 marks)

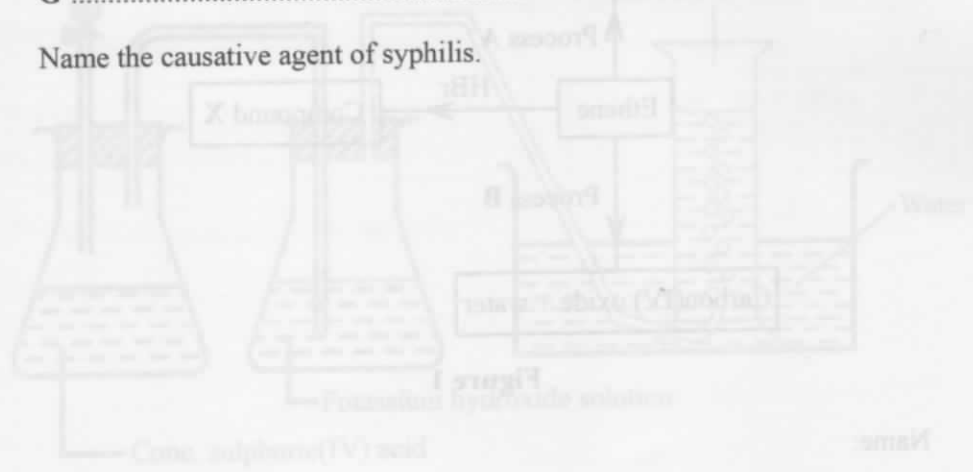


- (a) Name the type of pregnancy that occurs when implantation takes place in the part labelled E. (1 mark)
- (b) State the function of each of the parts labelled F and G. (2 marks)

F

G

- (c) Name the causative agent of syphilis. (1 mark)



- (a) Name (1 mark)
- (i) Process A (1 mark)
- (ii) Process B (1 mark)
- (b) (i) (1 mark)
- (ii) (1 mark)

13. The diagram below represents a climbing plant with its tendrils coiled around a twig.



- (a) Name the type of tropic response illustrated in the diagram. (1 mark)
- (b) Explain how the coiling occurs as illustrated in the diagram. (3 marks)

SECTION B: CHEMISTRY (33 marks)

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

14. Study the flow chart in **Figure 1** and answer the questions that follow.

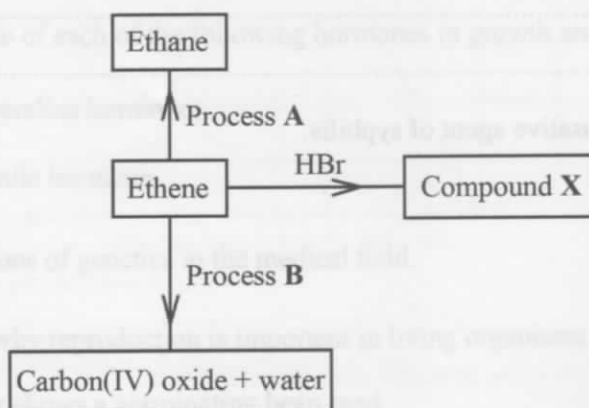


Figure 1

- (a) Name:
- (i) Process A (1 mark)
- (ii) Process B (1 mark)
- (b) (i) Draw the structural formula of compound X. (1 mark)

(ii) Give the IUPAC name of compound X. (1 mark)

(a) Define the term diffusion. (1 mark)

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

(c) Explain the difference between the rate of diffusion of liquids and that of gases. (2 marks)

Study the equation given and answer the questions that follow.



(a) Name the heat change represented by the equation. (1 mark)

(b) Give the nature of heat change in the equation. (1 mark)

(a) Define the term molar solution. (1 mark)

(b) 4.0 g of sodium hydroxide were dissolved in water to make 500 cm³ of solution. Determine the concentration of the solution in moles per litre. (2 marks)

(Na = 23.0, O = 16.0, H = 1.0)

(a) Name two allotropes of carbon. (1 mark)

(b) The setup in Figure 2 was used to prepare carbon(II) oxide in the laboratory. Study it and answer the questions that follow.

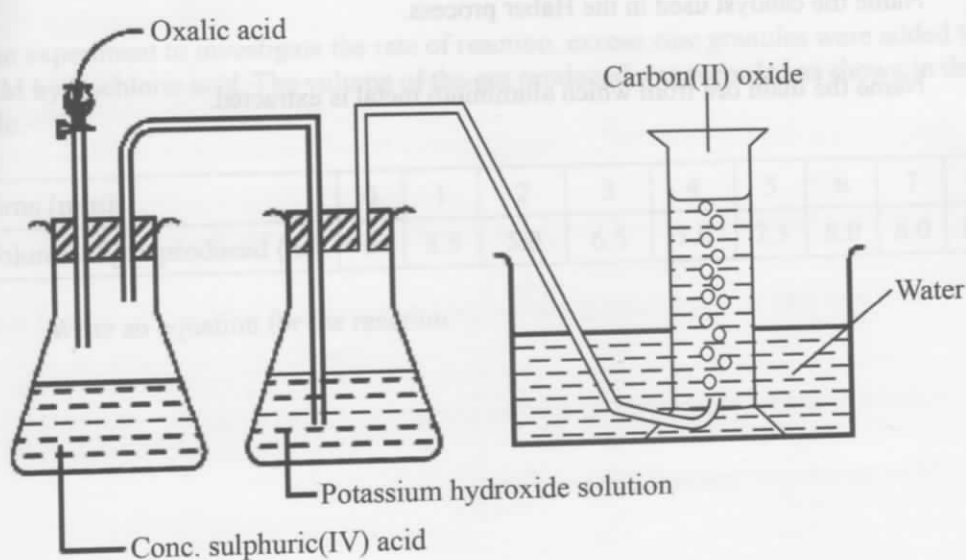


Figure 2

(i) State the role of potassium hydroxide in the set-up. (1 mark)

(ii) Write an equation to show the combustion of carbon(II) oxide. (1 mark)

- (iii) List **two** precautions taken when preparing carbon(II) oxide gas. (2 marks)

19. The flow chart in **Figure 3** represents the Haber process. Study it and answer the questions that follow.

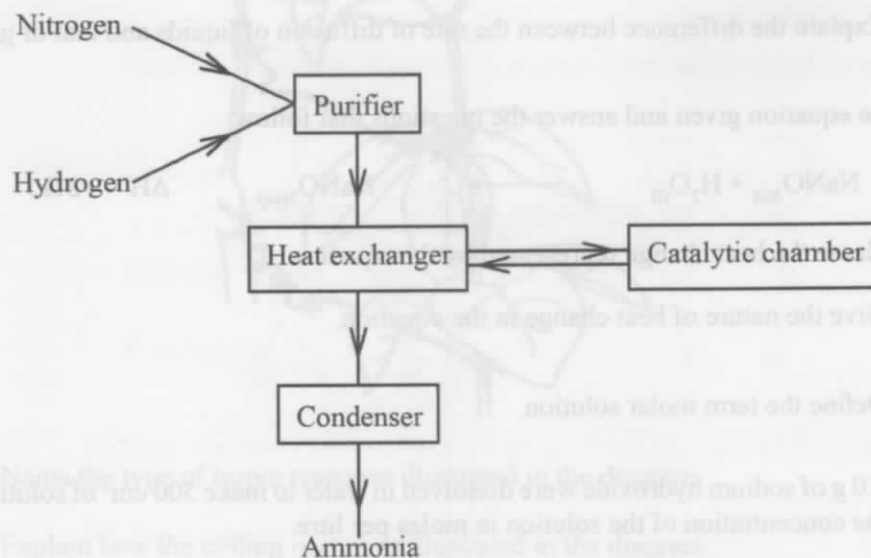
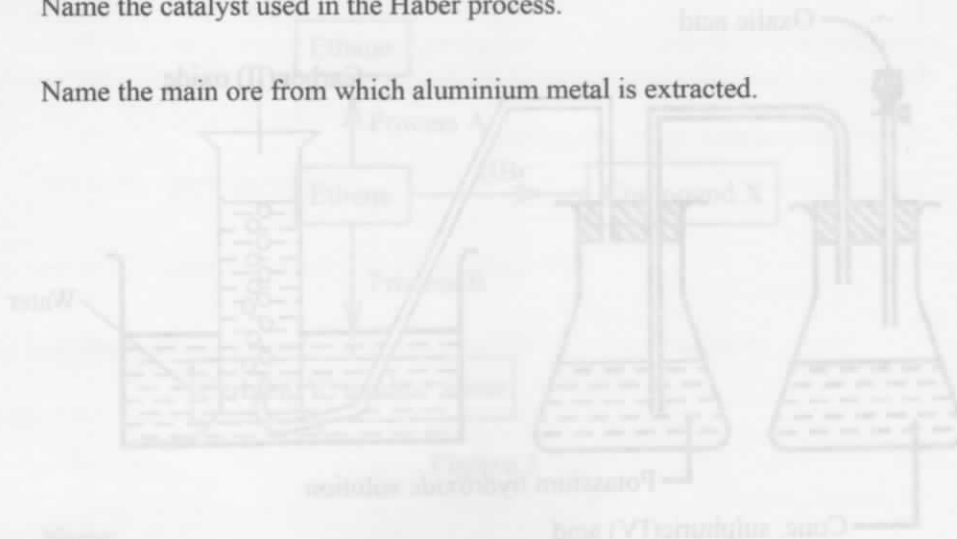


Figure 3

- (a) State the function of the purifier. (1 mark)
- (b) Write an equation for the reaction which occurs in the catalytic chamber. (1 mark)
- (c) Name the catalyst used in the Haber process. (1 mark)
20. (a) Name the main ore from which aluminium metal is extracted. (1 mark)



- (b) **Figure 4** shows how aluminium metal is extracted from its ore using electrolysis method. Use it to answer the questions that follow.

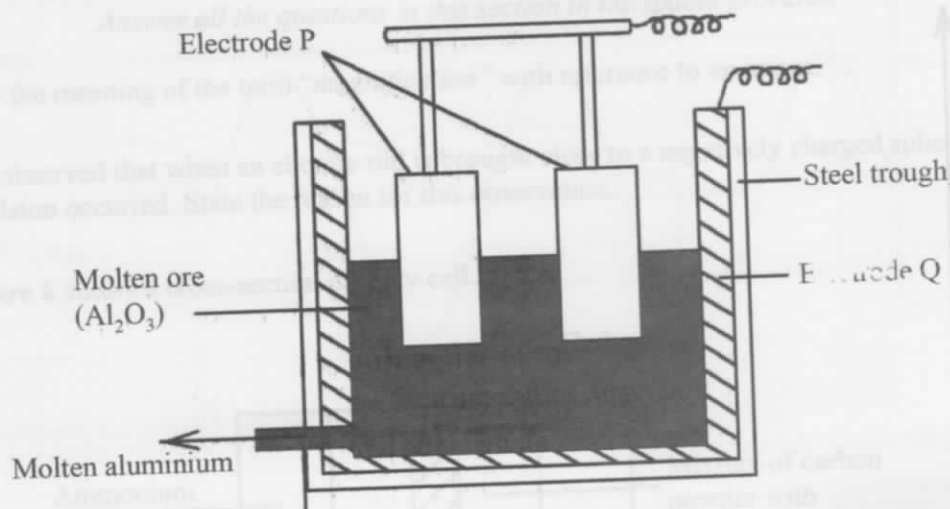


Figure 4

- (i) Identify the electrodes labelled:
- P (1 mark)
- Q (1 mark)
- (ii) Name the product formed at electrode P. (1 mark)
- (c) State **one** use of aluminium metal. (1 mark)

21. In an experiment to investigate the rate of reaction, excess zinc granules were added to 15 cm³ of 1.0 M hydrochloric acid. The volume of the gas produced was recorded as shown in the following table.

Time (min)	0	1	2	3	4	5	6	7	8
Volume of gas produced (ml)	0	3.5	5.0	6.5	7.0	7.5	8.0	8.0	8.0

- (a) Write an equation for the reaction. (1 mark)

(b) On the grid provided, sketch a curve that would be obtained from the experiment.

(1 mark)

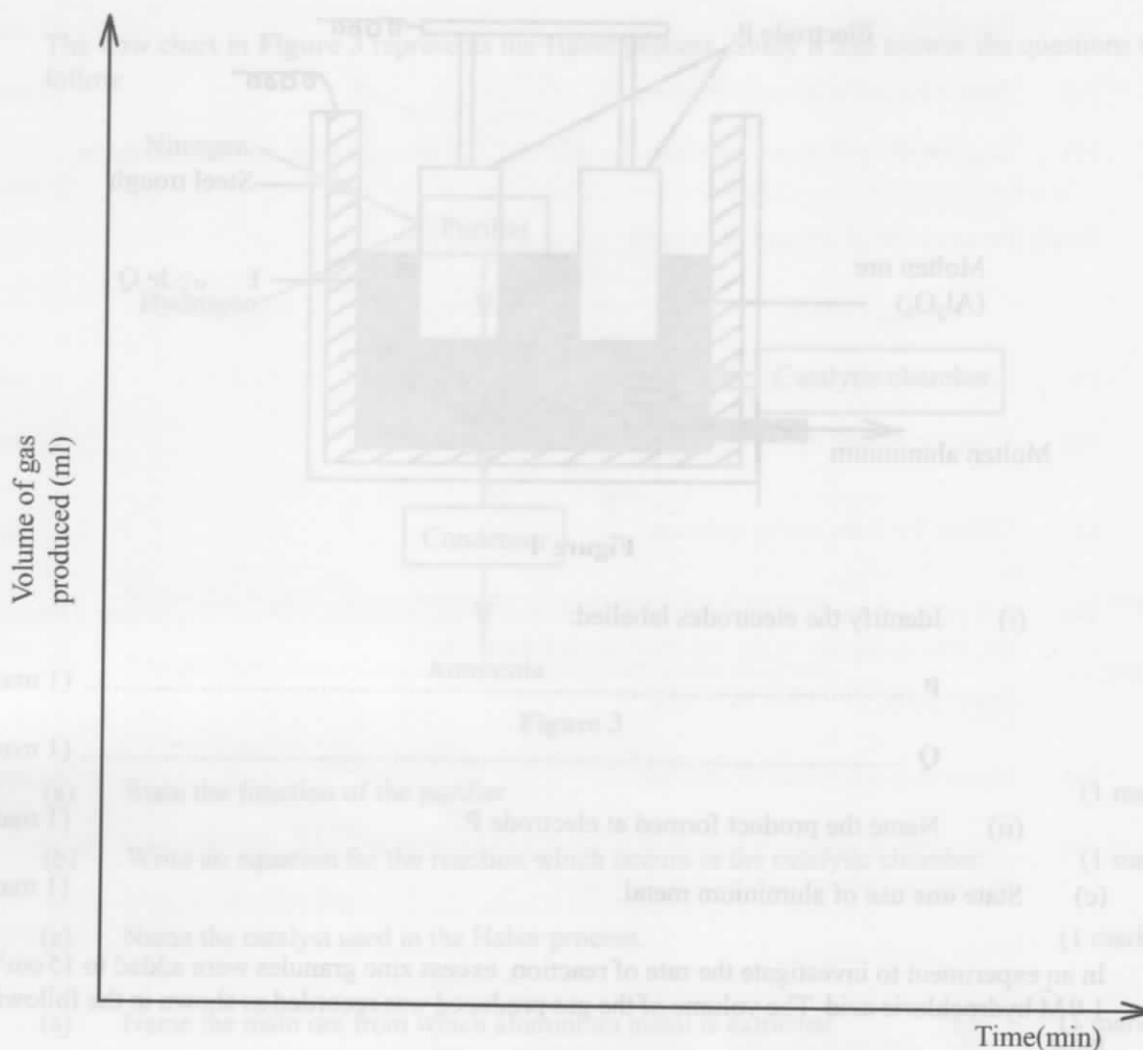


Figure 5

(c) Explain why the volume of the gas remained constant after the sixth minute. (1 mark)

(d) Give **one** way in which zinc granules can be modified to increase the rate of the reaction. (1 mark)

22. (a) Give **one** main precaution taken when using charcoal as a fuel. (1 mark)

(b) State **two** environmental effects of using kerosene fuel. (2 marks)

SECTION C: PHYSICS (33 marks)

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

23. State the meaning of the term "magnification" with reference to an image. (1 mark)
24. It is observed that when an ebonite rod is brought close to a negatively charged sphere, repulsion occurred. State the reason for this observation. (1 mark)
25. Figure 6 shows a cross-section of a dry cell.

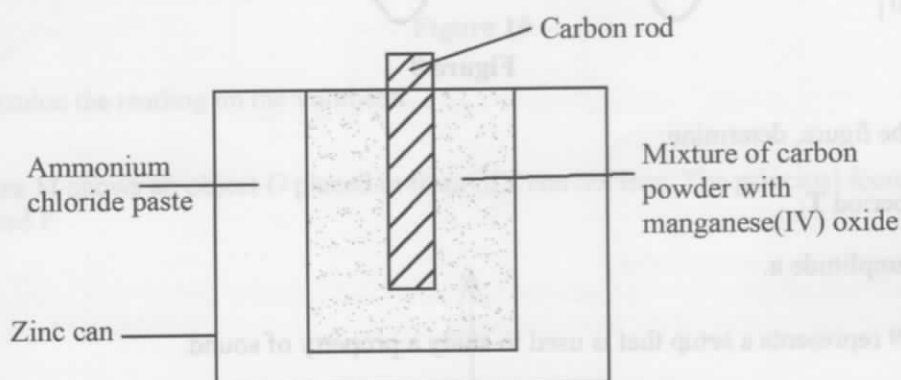


Figure 6

State the role of each of the following:

- (a) carbon rod; (1 mark)
- (b) carbon powder; (1 mark)
- (c) manganese(IV) oxide. (1 mark)
26. Figure 7 shows a horseshoe magnet attracting a pin. The tip of the pin is *south pole*.

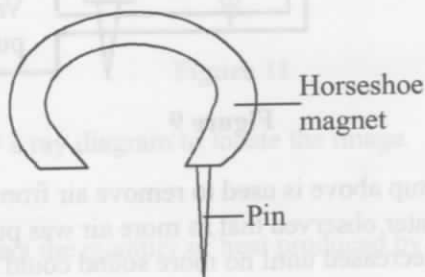


Figure 7

Label on the same diagram, the poles of the horseshoe magnet. (1 mark)

27. Figure 8 shows a waveform.

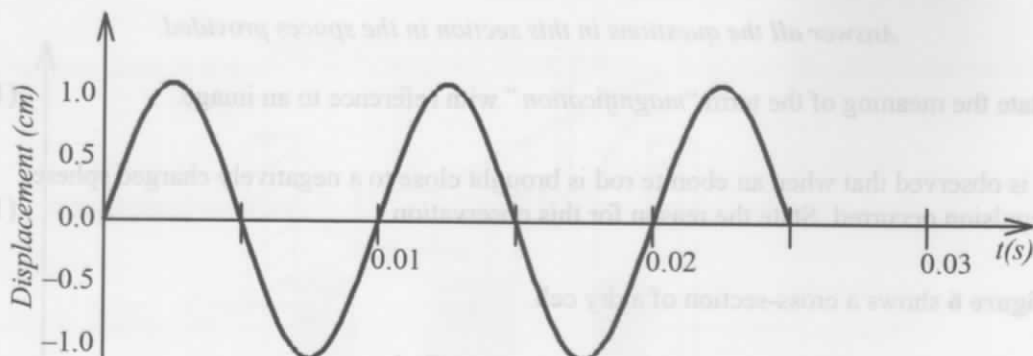


Figure 8

Using the figure, determine:

- (a) period T ; (1 mark)
- (b) amplitude a . (1 mark)
28. Figure 9 represents a setup that is used to study a property of sound.

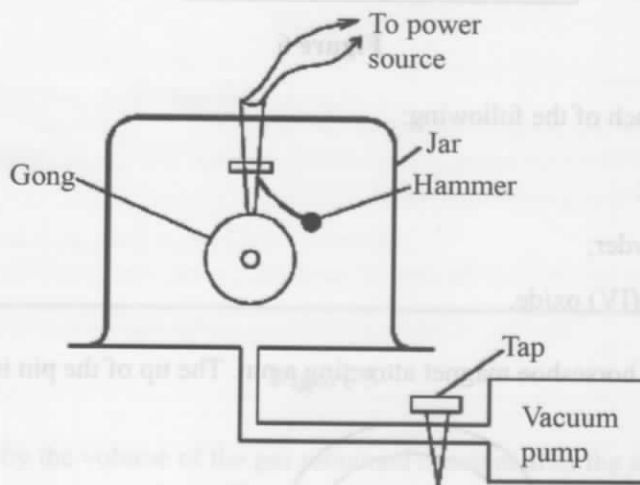


Figure 9

The vacuum pump in the setup above is used to remove air from the jar. Initially the sound of the bell could be heard. It was later observed that as more air was pumped out of the jar, the loudness of the sound from the bell decreased until no more sound could be heard.

Explain this observation.

(2 marks)

29. **Figure 10** shows a battery whose potential difference is 3 V and of negligible internal resistance connected to resistor R . Voltmeter V is connected across R .

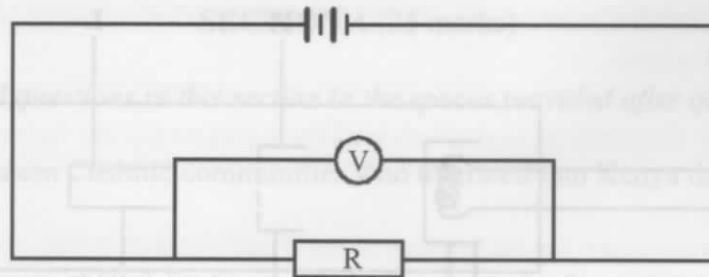


Figure 10

Determine the reading on the voltmeter. (1 mark)

30. **Figure 11** shows an object O placed in front of a convex lens. The principal focus of the lens is marked F .

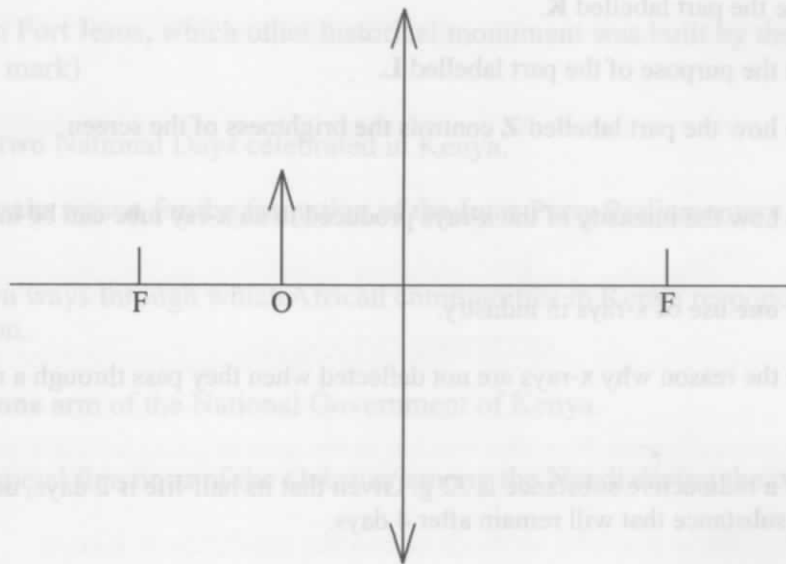


Figure 11

On the same figure, draw a ray diagram to locate the image. (3 marks)

31. State **two** factors that affect the quantity of heat produced by a heater coil connected to a power source. (2 marks)

32. (a) Explain why thick cables are preferred in long distance transmission of power. (2 marks)

- (b) State the reason why the metallic surface of an electric iron box should be connected to the earth wire. (2 marks)

33. Figure 12 shows a simplified cathode ray tube.

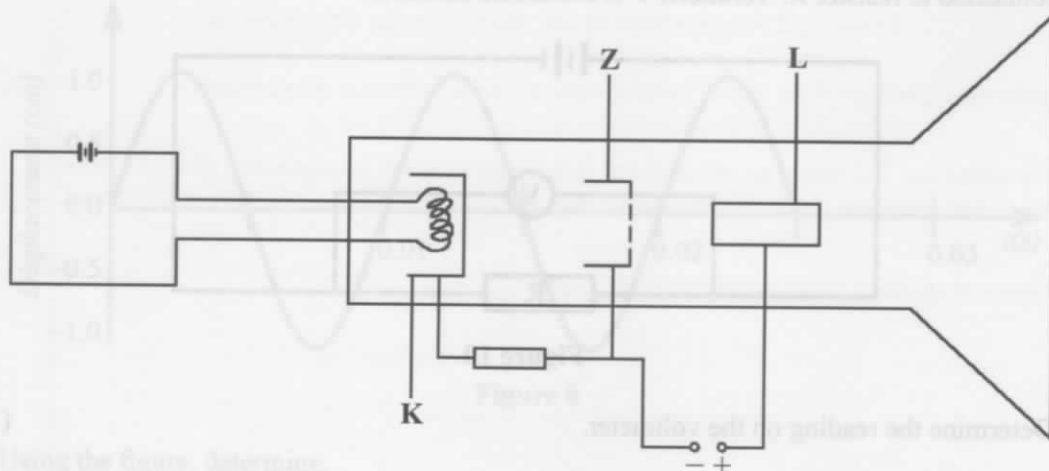


Figure 12

- (a) Name the part labelled **K**. (1 mark)
- (b) State the purpose of the part labelled **L**. (1 mark)
- (c) State how the part labelled **Z** controls the brightness of the screen. (1 mark)
34. (a) State how the intensity of the x-rays produced in an x-ray tube can be increased. (1 mark)
- (b) State **one** use of x-rays in industry. (1 mark)
- (c) State the reason why x-rays are not deflected when they pass through a magnetic field. (1 mark)
35. The mass of a radioactive substance is 32 g. Given that its half-life is 2 days, determine the mass of the substance that will remain after 4 days. (3 marks)
36. Explain how a pure silicon crystal can be made into a *p-type* semi conductor. (3 marks)
37. State **one** example of a longitudinal wave. (1 mark)