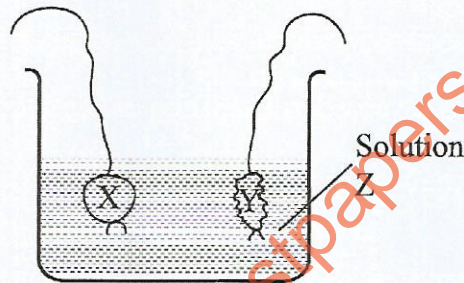


4.6.1 General Science Paper 1 (237/1)

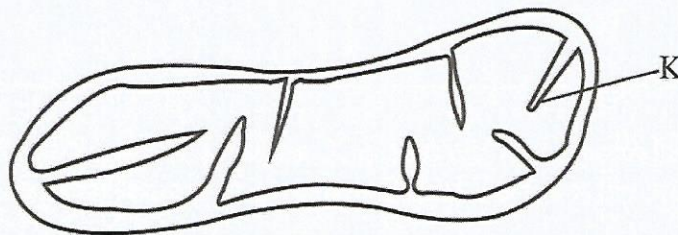
SECTION A: BIOLOGY (34 marks)

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

1. (a) Name **two** types of respiration that take place in an animal tissue. (2 marks)
- (b) State **two** characteristics of living organisms that are specific to plants only. (2 marks)
2. Explain **three** features of respiratory surfaces that adapts them to their function. (3 marks)
3. The diagram below illustrates an experiment used to demonstrate water relationship in plant cells. X and Y are solutions in bags whose walls are semi-permeable.

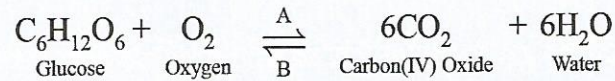


- (a) Identify the solution which is hypotonic to the liquid in the beaker. (1 mark)
- (b) Account for the observation made in the bag containing solution X. (2 marks)
4. (a) Explain the presence of non-return valves in the veins of a mammalian circulatory system. (2 marks)
- (b) Name **two** proteins in the blood which are responsible for determining the blood group of a person. (2 marks)
5. Explain why glucose and protein are absent in urine of a healthy person. (2 marks)
6. The diagram below represents a cell organelle.



- (a) Identify the organelle. (1 mark)
- (b) How is the part labelled **K** adapted to its function? (2 marks)

7. State **three** roles of saliva in the human digestive system. (3 marks)
8. Study the equation below and answer the questions that follow.



- (a) Identify processes A and B. (2 marks)
- A
- B
- (b) In which cell organelle does process B take place? (1 mark)
9. (a) Name the condition associated with the presence of sugar in urine. (1 mark)
- (b) Name the **two** hormones involved in regulation of blood sugar in humans. (2 marks)
- (c) State **two** functions of the liver in humans. (2 marks)
10. (a) Explain the following terms as used in blood transfusion:
- (i) Universal donor (1 mark)
- (ii) Universal recipient (1 mark)
- (b) State the branch of biology that deals with plants. (1 mark)
- (c) State the role of ribosomes in the cell. (1 mark)

SECTION B: CHEMISTRY (33 marks)

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

11. **Figure 1** is a setup to separate a mixture of substances B and C. Study it and answer the questions that follow.

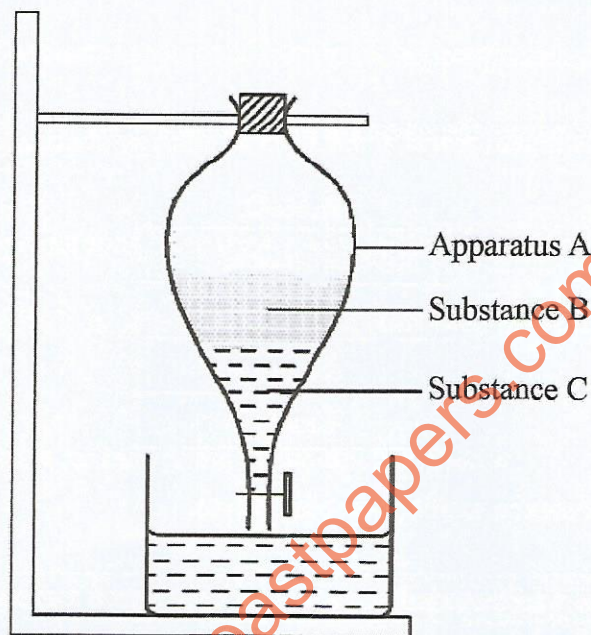


Figure 1

- (a) Identify apparatus A. (1 mark)
- (b) State **two** properties that make substances B and C to separate. (2 marks)
12. Fill in the spaces provided in **Table 1**. (2 marks)

Table 1

Name of the element	Chemical symbol
Sodium	
	Hg

13. (a) Element X and Y are alkali metals. X is above Y in the periodic table. Explain the differences in their ionisation energies. (X and Y are not the actual symbols of the elements). (2 marks)

(b) The atomic number of element W is 13. Give the period and group to which the element belongs.

(i) Period _____ (1 mark)

(ii) Group _____ (1 mark)

14. (a) Define the term mass number. (1 mark)

(b) Use **Table 2** to answer the question that follow.

Table 2

Substances
Urea
Sugar
Lemon

Identify the substance which is an electrolyte. (1 mark)

15. Burning sodium metal was lowered into a gas jar containing a green gas **E**. A white solid **F** was formed.

(a) Identify:

(i) Gas **E** _____ (1 mark)

(ii) Solid **F** _____ (1 mark)

(b) Name the product formed if sodium metal was replaced with zinc metal. (1 mark)

(c) Write a chemical equation for the reaction taking place between zinc and gas **E**. (1 mark)

16. Study the setup in **Figure 2** and answer the questions that follow.

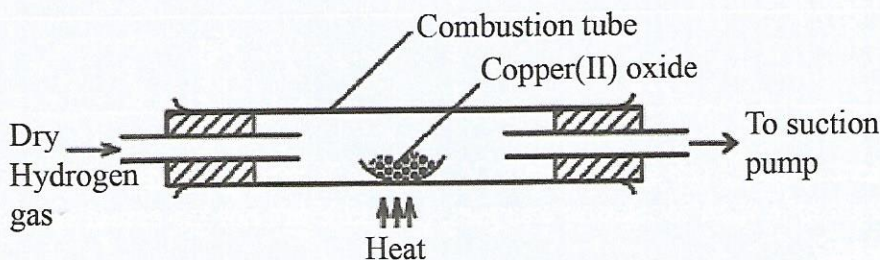


Figure 2

(c) State two observations made in the combustion tube.

(2 marks)

- (b) Give the chemical property of hydrogen gas in the setup (1 mark)
17. (a) What is an acid-base indicator? (1 mark)
- (b) Complete the following general equation. (1 mark)

Metal + Dilute Acid \longrightarrow

18. Study the flow chart in Figure 3 and answer the questions that follow.

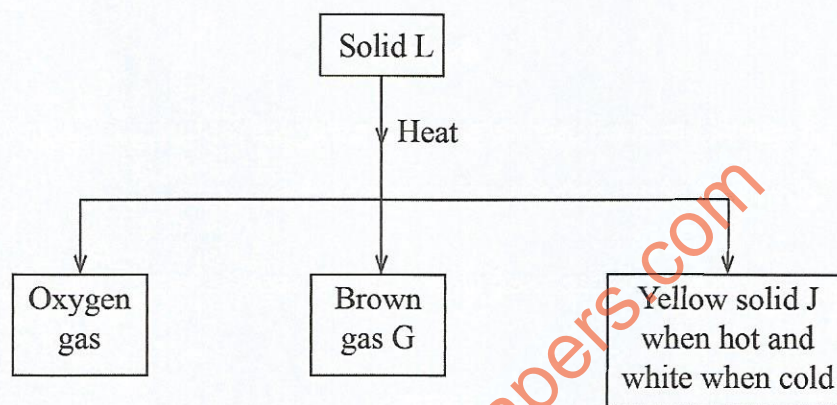
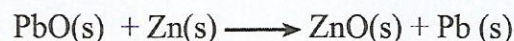


Figure 3

- (a) Identify:
- (i) Solid L (1 mark)
- (ii) Solid J (1 mark)
- (b) Write a balanced chemical equation for the decomposition of solid L. (1 mark)
19. (a) Using dot (•) and cross (x) diagram, illustrate the bonding formed when element P reacts with element Q. (Atomic number of P is 12 and that of Q is 17). (2 marks)
- (b) Name the type of bond in (a) (1 mark)
20. (a) The following equation shows the oxidation and reduction processes of lead(II) oxide and zinc.



When the same reaction was repeated using magnesium oxide instead of lead(II) oxide, no product was formed. Explain. (2 marks)

- (b) The following diagram in **Figure 4** shows an iron water pipe fitted with blocks of zinc.

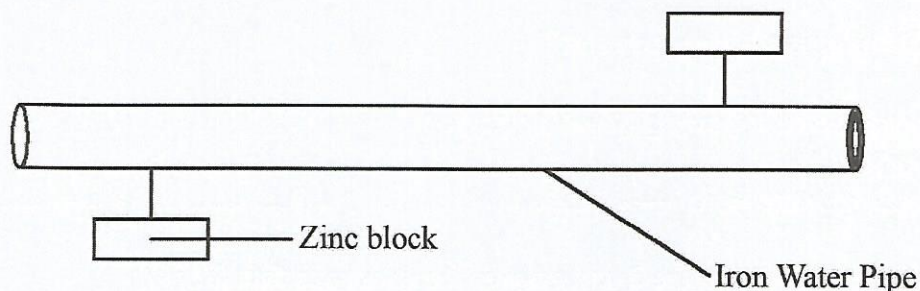


Figure 4

- (i) Name the method used to prevent rusting of the iron water pipe. (1 mark)
- (ii) Give **one** other method used to prevent rusting. (1 mark)
21. **Table 3** shows the volume of soap used with equal volumes of water from different sources to form lather.

Table 3

Water source	Volume of soap used
H	12 cm ³
Z	2 cm ³

- (a) Identify which water source is hard. (1 mark)
- (b) Describe how sodium carbonate can be used to soften hard water. (2 marks)

SECTION C: PHYSICS (33 marks)

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

22. State **one** laboratory safety rule that must be observed by a student when operating an electrical equipment. (1 mark)
23. **Figure 5** shows a measuring cylinder containing a liquid of mass 40 g.

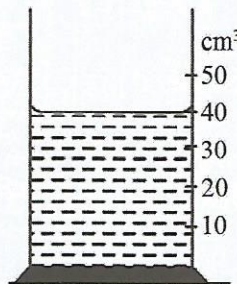


Figure 5

Determine:

- (a) the volume of the liquid. (1 mark)
- (b) the density of the liquid. (3 marks)
24. **Figure 6** shows a capillary tube dipped in water in a covered beaker.

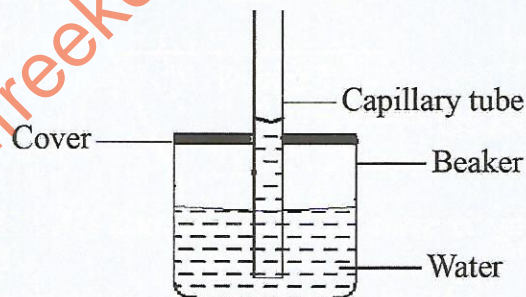


Figure 6

- (a) State the force that causes the rise of water in the tube. (1 mark)
- (b) State what would happen to the level of water in the tube when the water in the beaker is heated for some time. (1 mark)

25. Figure 7 shows two pins P and Q that are to be driven into a bar soap.

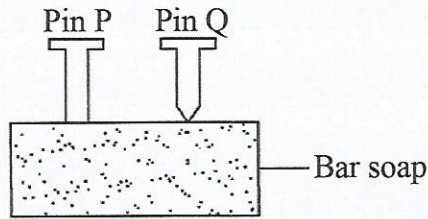


Figure 7

- (a) Equal forces are applied on pin P and pin Q. State which pin would be more easily driven into the bar soap. (1 mark)
- (b) Explain the reason for your answer in 25(a). (2 marks)
26. Smoke particles enclosed in a transparent glass bottle are seen to be moving randomly when viewed through a microscope. Explain this observation. (2 marks)
27. Figure 8 shows a clinical thermometer.

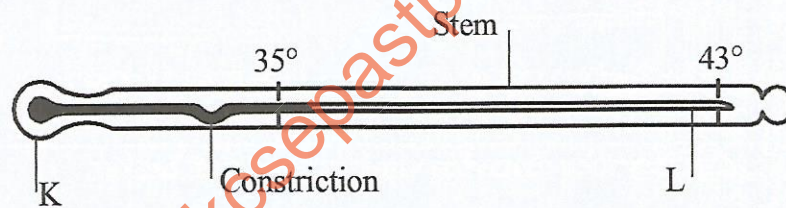


Figure 8

- (a) Identify the parts labelled K and L. (2 marks)
- (b) State the reason why the scale does not go beyond 43°. (1 mark)

28. **Figure 9** shows two insulated containers fitted with a thermometer. The two containers are filled with water at 100° . Container P is filled with water to the brim while container Q is partially full.

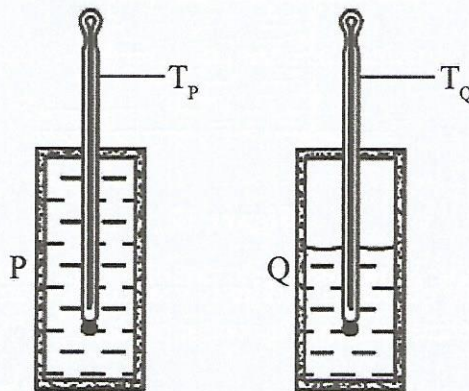


Figure 9

- (a) State the thermometer which will have the lowest reading after some time. (1 mark)
- (b) State the reason for the answer in 28(a). (1 mark)
29. A uniform metre rule weighing 6.4 N is pivoted at the 60 cm mark. Determine the point on the metre rule where a weight of 3.2 N should be suspended for the rule to be at equilibrium. (4 marks)
30. (a) **Figure 10** shows an object resting on a flat surface.

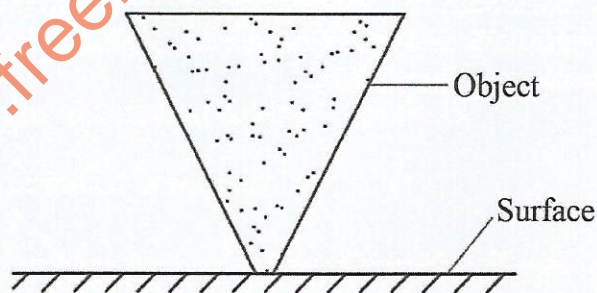


Figure 10

- Identify its state of equilibrium. (1 mark)
- (b) State **two** ways in which the stability of a body can be increased. (2 marks)
31. A student intends to make a steel spring that can support a large load without getting damaged. State **three** factors that the student should consider when making the spring. (3 marks)
32. State the meaning of the term *displacement*. (1 mark)

33. Figure 11 shows a bucket filled with water to the brim resting on a horizontal surface.

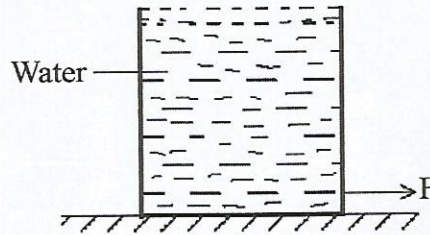


Figure 11

It is observed that, when the bucket is suddenly moved forward by a force F , some water spills out in the backwards. State the reason why water spills. (1 mark)

34. Figure 12 shows an inclined plane being used to move a load onto a platform of height h .

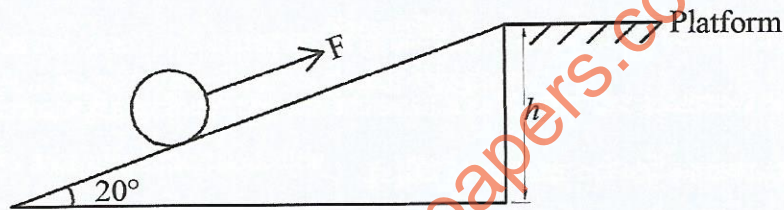


Figure 12

State **two** adjustments that can be done to ensure that a lesser force is used in moving the load onto the platform. (2 marks)

35. Figure 13 (i) shows a Eureka can full of water and a measuring cylinder put below the spout. When an object of weight 0.5 N is placed in water, it floats and displaces some water into the measuring cylinder as shown in figure 9(ii).

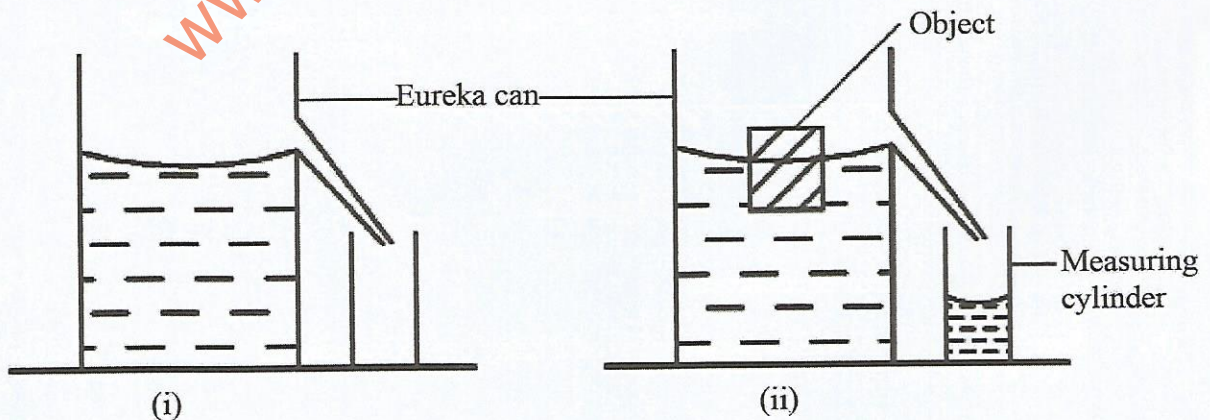


Figure 13

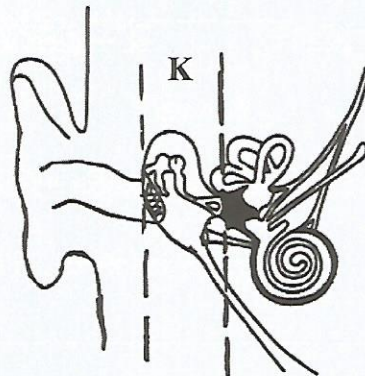
- (a) State the weight of water in the measuring cylinders. (1 mark)

- (b) State the reason for the answer in 35(a). (1 mark)

SECTION A: BIOLOGY (34 marks)

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

1. (a) Define each of the following terms as used in ecology:
 - (i) Food chain (1 mark)
 - (ii) Population (1 mark)
- (b) State **two** biotic factors that influence distribution of organisms in an ecosystem. (2 marks)
2. (a) (i) What are saprophytes? (1 mark)
- (ii) Give an example of a saprophyte. (1 mark)
- (b) State **two** functions of the urethra. (2 marks)
3. (a) Give **two** functions of the umbilical cord in humans. (2 marks)
- (b) State **two** roles of progesterone hormone in the menstrual cycle. (2 marks)
4. (a) State **two** causes of seed dormancy. (2 marks)
- (b) Explain how seed dormancy is broken. (2 marks)
5. (a) Name the hormone responsible for moulting in insects. (1 mark)
- (b) State **two** benefits of variation in living organisms. (2 marks)
6. Explain how sex is determined in humans. (4 marks)
7. The diagram below represents the human ear with one of its sections labelled K.



- (a) Explain how **K** is adapted to its functions. (3 marks)
- (b) Name **one** defect of the human ear. (1 mark)