

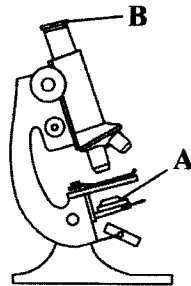
4.6 GENERAL SCIENCE (237)

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. Name a branch of Biology that deals with the study of animals. (1 mark)
2. State **two** domestic applications of anaerobic respiration. (2 marks)
3. (a) Define the following terms as used in cell physiology:
 - (i) diffusion (1 mark)
 - (ii) active transport (1 mark)(b) State how support is achieved in young herbaceous plants. (1 mark)
4. The diagram below represents a light microscope.



- (a) Name the part labelled **B**. (1 mark)
- (b) State the function of the part labelled **A**. (1 mark)
- (c) Identify **two** organelles of an animal cell that would be seen under the light microscope. (2 marks)
5. (a) What is the meaning of the term excretion? (1 mark)
- (b) State **two** reasons why excretion is necessary in animals. (2 marks)
6. The scientific name of a lion is *Panthera Leo*. Classify the organism under the following taxonomic units:
 - (a) class (1 mark)
 - (b) genus (1 mark)
7. Describe absorption of water from the soil by the root hairs. (3 marks)

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8. (a) Name **two** members of the Kingdom Protocista. (2 marks)
- (b) Name **two** causes of liver cirrhosis. (2 marks)
9. Explain the significance of the following in the feeding of a mammal:
- (a) long tongue in herbivores (2 marks)
- (b) canines in carnivores (1 mark)
10. (a) Explain the importance of gaseous exchange in humans. (2 marks)
- (b) Name the main gaseous exchange structure in terrestrial plants. (1 mark)
11. (a) State the role of enzymes in metabolic processes. (1 mark)
- (b) Explain the difference in energy requirements for a man and a woman of the same age. (2 marks)
12. (a) Explain why ventricles have thicker walls than the auricles. (2 marks)
- (b) State the role of platelets in the human body. (1 mark)

SECTION B: CHEMISTRY (33 marks)

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

13. **Table 1** shows the pH values of various solutions. Use it to answer the questions that follow.

Table 1

Solution	F	E	D	H	G
pH	1.0	7.0	12.0	6.5	10.5

- (a) Identify the nature of the substance formed when **F** and **D** react. (1 mark)
- (b) Identify the solution likely to be a:
- (i) weak acid (½ mark)
- (ii) weak base (½ mark)
14. (a) A student prepared an insoluble salt by mixing two different salt solutions.
- (i) Identify the method used to prepare the insoluble salt. (1 mark)

- (ii) Name **one** other method which can be used to prepare insoluble salts. (1 mark)
- (b) Give **one** industrial use of sodium carbonate salt. (1 mark)
15. (a) A student used salt solution to remove blood stains from the school uniform. Name the method of separation the student applied. (1 mark)
- (b) Anhydrous calcium chloride when left in the open forms a solution.
- (i) Give the term used to describe such a substance. (1 mark)
- (ii) State **one** major application of such a substance. (1 mark)
16. A sample of hard water was divided into three portions. **Table 2** shows the tests and observations made on each portion.

Table 2

Portion	Test	Observation
1	1 cm ³ of soap added and shaken.	No lather was formed.
2	Boiled and cooled. 1 cm ³ of soap was added and shaken.	No lather was formed.
3	3 cm ³ of sodium carbonate was added and filtration done. 1 cm ³ of soap was added to the filtrate and shaken.	Lather formed immediately.

- (a) Name the type of water hardness that was present in the sample. (1 mark)
- (b) Identify **two** anions present in the water sample. (1 mark)
- (c) Give **one** other substance that can be used for portion three instead of sodium carbonate. (1 mark)
17. (a) Distinguish between a covalent bond and a co-ordinate bond. (2 marks)

(b) **Figure 1** is a diagram of ammonium ion.

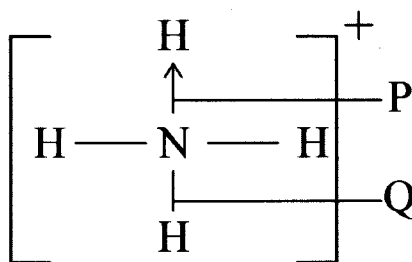


Figure 1

Name the type of bond labelled.

(i) **P**

(½ mark)

(ii) **Q**

(½ mark)

18. **Figure 2** represents a cooling curve for a liquid. Study it and answer the questions that follow.

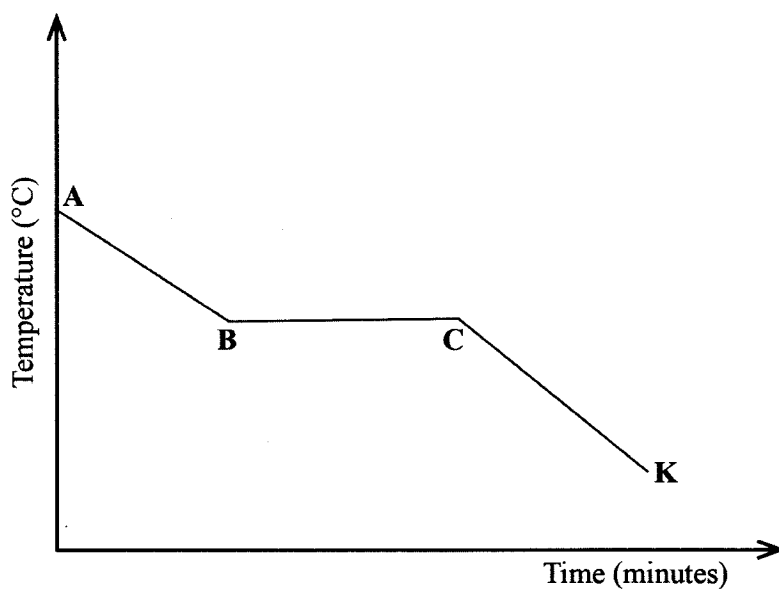


Figure 2

(a) Explain why the temperature remained constant at region **B** and **C**. (2 marks)

(b) Give the physical state of the substance at region **CK**. (1 mark)

19. (a) Name the chemical family of the elements *Helium*, *Neon* and *Argon*. (1 mark)

- (b) Elements V, X, Y and Z belong to the same group in the periodic table. Table 3 gives information about the elements. Use it to answer the questions that follow. The letters do **not** represent the actual symbol of the elements.

Table 3

Element	Atomic radii (nm)	Melting point (°C)
V	0.152	180
X	0.186	98
Y	0.231	64
Z	0.244	39

Explain the trend in:

- (i) atomic radii (1 mark)
- (ii) melting point (1 mark)
20. (a) Define the term electrolyte. (1 mark)
- (b) Mercury and molten lead(II) bromide are good conductors of electricity. Explain how each one of them conducts electricity. (2 marks)
21. (a) Name **two** subatomic particles. (1 mark)
- (b) **Figure 3** shows part of a periodic table. Study it and answer the questions that follow. The letters do **not** represent the actual symbol of the elements.

N							
			J				
					M		L
R							

Figure 3

- (i) State the period to which element J belongs. (1 mark)
- (ii) Write the formula of the compound formed when element R reacts with element M. (1 mark)
- (iii) State the nature of the oxide formed by element N. (1 mark)

22. The set-ups I, II and III in **Figure 4** shows different methods of gas collection used in the laboratory. Use it to answer the questions that follow.

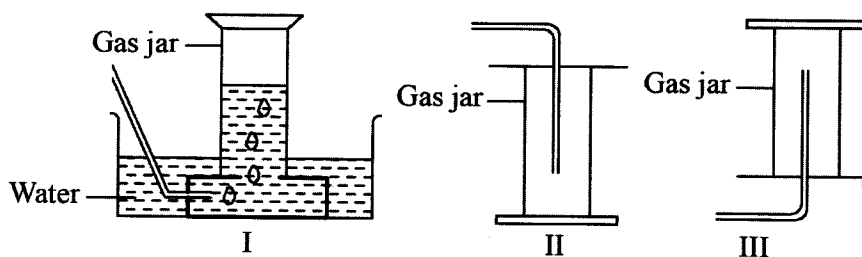


Figure 4

- (a) Identify the set-up used to collect dry hydrogen gas. (1 mark)
- (b) State **one** property of the gas collected using set-up II. (1 mark)
- (c) Name the method of gas collection in set-up I. (1 mark)
23. **Figure 5** shows an experimental set-up used to investigate the active part of air. Study it and answer the questions that follow.

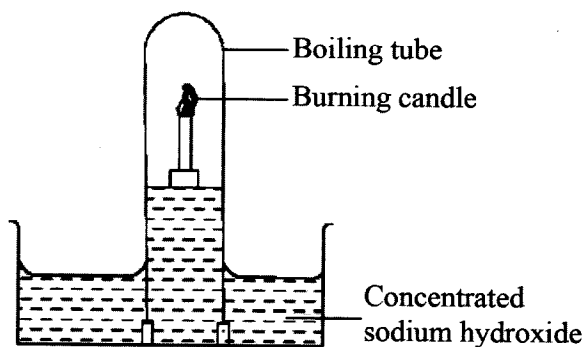


Figure 5

- (a) In the space provided next to **Figure 5** draw a diagram to show observations made at the end of the experiment. (2 marks)
- (b) Explain the role of concentrated sodium hydroxide in the experiment. (1 mark)

SECTION C: PHYSICS (33 marks)

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

24. **Figure 6** shows a syringe containing a liquid.

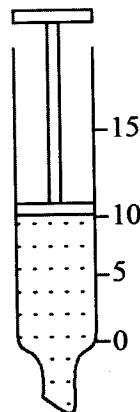


Figure 6

- The mass of the syringe in **Figure 6** when empty is 20 g and when filled with some liquid, it weighs 30 g. Determine the density of the liquid. (*the syringe is graduated in cm³*) (3 marks)
25. Explain why a drop of water placed on a clean glass surface spreads out. (2 marks)
26. A beaker of height 0.15 m is filled with a liquid of density 13600 kg m^{-3} . Determine the pressure due to the liquid at the bottom of the beaker. ($g = 10 \text{ N kg}^{-1}$) (3 marks)
27. A student observed that dust particles illuminated by a beam of light in a room moved in a constant random motion. Explain this observation. (2 marks)
28. State the **three** modes of heat transfer. (3 marks)
29. State **two** reasons why water is **not** suitable for use as a thermometric liquid. (2 marks)

30. Figure 7 shows a uniform plank of length 2 m and a weight of 75 N. It is pivoted at a distance y from one end and balanced by a weight of 50 N.

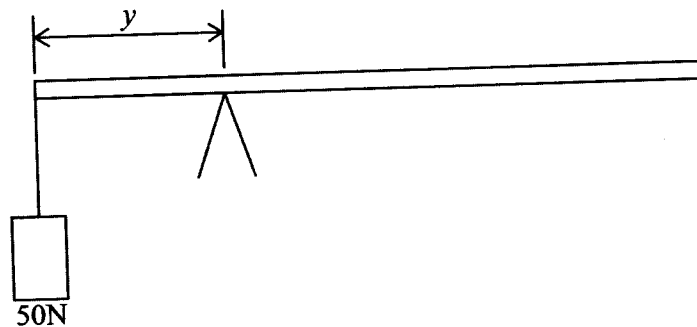


Figure 7

Determine the value of y .

(3 marks)

31. Figure 8 shows a stone resting on a horizontal surface.

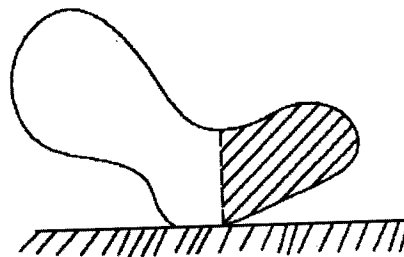


Figure 8

Explain the effect on the stability of the stone when the shaded part is chopped off. (2 marks)

32. A certain mass was attached to a spring. When the mass was removed, it was observed that the spring did **not** regain its original length. State the reason for this observation. (1 mark)
33. A train moving at a velocity of 25 ms^{-1} decelerates uniformly and comes to rest in 10 seconds. It then starts moving again after 5 seconds and accelerates uniformly to a velocity of 10 ms^{-1} in 5 seconds. Sketch a velocity – time graph for the motion of the train within this period. (3 marks)
34. A spherical marble rolls freely on a floor until it comes to rest. State **two** factors that determine the distance it covers before stopping. (2 marks)
35. A stone is thrown vertically upwards and returns to the ground after some time. State the energy changes that take place. (2 marks)
36. It is observed that a boat sinks more in fresh water than in sea water. Explain this observation. (3 marks)
37. State **two** reasons why it is necessary to tidy up the laboratory after a physics experiment. (2 marks)