

3.8 GENERAL SCIENCE (237)

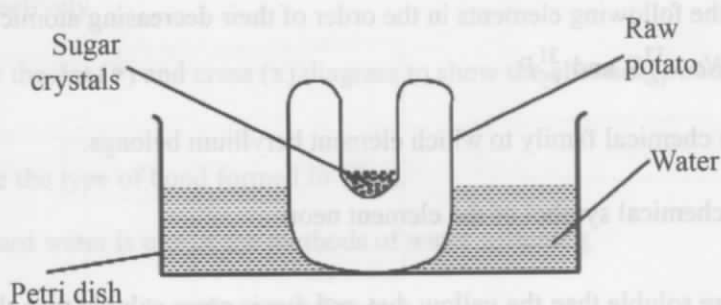
3.8.1 General Science Paper 1 (237/1)

SECTION A: BIOLOGY (34 marks)

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

1. (a) Name the causative agent of pneumonia. (1 mark)
- (b) Explain the changes that take place in the intercostal muscles and the diaphragm during exhalation:
- (i) Intercostal muscles; (1 mark)
- (ii) Diaphragm. (1 mark)
2. (a) Name the branch of botany that deals with classification of living organisms. (1 mark)
- (b) Explain why mating between a horse and a donkey produces an infertile offspring. (2 marks)
3. (a) State the difference between a tissue and an organ. (2 marks)
- (b) Name **two** processes which are controlled by the nucleus in a cell. (2 marks)
4. (a) State **two** advantages of aerobic respiration over anaerobic respiration. (2 marks)
- (b) What is vaccination? (2 marks)
5. (a) State **one** way of controlling arteriosclerosis. (1 mark)
- (b) State **two** environmental factors that reduce the rate of transpiration. (2 marks)
6. State **three** functions of lipids in animals. (3 marks)
7. State **three** factors which can increase the rate of photosynthesis when light intensity is optimum. (3 marks)
8. (a) What is the function of the septum in the human heart? (1 mark)
- (b) Name the condition that causes the presence of glucose in human urine. (1 mark)

9. The diagram below represents a setup used to investigate a physiological process.



- (a) State **two** observations that will be made in the setup after one hour. (1 mark)
- (b) Account for the observation. (2 marks)
10. (a) State **three** physiological changes that take place in the skin during a cold day. (3 marks)
- (b) State **two** functions of the liver in homeostasis. (2 marks)
- (c) Name **one** disease of the kidney that is characterised by obstruction of the ureter. (1 mark)

### SECTION B: CHEMISTRY (33 marks)

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

11. Using dot (•) or cross (x) to represent electrons, draw the diagram of atom  $^{35}_{17}\text{Cl}$  (2 marks)
12. The following table shows the pH values of some solutions. Study it and answer the questions that follow.

Solution	A	B	C	D
pH	10	13	1	6

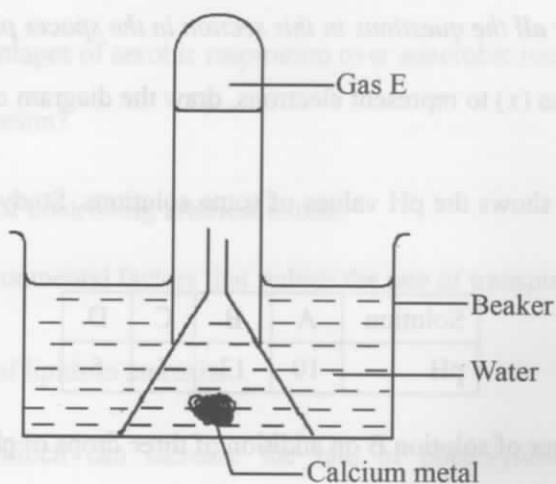
- (a) Give the colour of solution B on addition of three drops of phenolphthalein indicator. (1 mark)
- (b) State **one** major use of solution A. (1 mark)
- (c) Name the general products formed when solution A reacts with solution D. (1 mark)

13. (a) Define the term cation. (1 mark)
- (b) Arrange the following elements in the order of their decreasing atomic size. (2 marks)  
 ${}_{13}^{27}\text{Al}$ ,  ${}_{11}^{23}\text{Na}$ ,  ${}_{16}^{32}\text{S}$  and  ${}_{15}^{31}\text{P}$
- (c) Name the chemical family to which element beryllium belongs. (1 mark)
- (d) Give the chemical symbol of the element neon. (1 mark)

14. Green dye is more soluble than the yellow dye, red dye is more soluble than the green dye while blue dye is the least soluble. Represent the dyes in the following paper chromatogram. (2 marks)



15. A student set up the following apparatus to investigate the reaction between calcium metal and water. Study it and answer the questions that follow.



- (a) State **one** observation that was made from the setup. (1 mark)
- (b) Identify gas E. (1 mark)
- (c) Describe how gas E can be tested in the laboratory. (2 marks)
16. Draw a well labelled setup to show how molten lead(II) bromide could be electrolysed using inert electrodes. (2 marks)

17. The electronic configuration of elements F and G (not actual symbol of the elements) are 2.8.2 and 2.6 respectively.

(a) Draw the dot (•) and cross (x) diagram to show the chemical bonding when F and G react. (2 marks)

(b) Name the type of bond formed in 17(a). (1 mark)

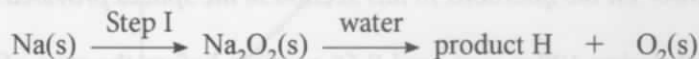
18. Boiling of hard water is one of the methods of water softening.

(a) Explain the meaning of water softening. (1 mark)

(b) Name the type of water hardness that can be softened by boiling. (1 mark)

(c) State **one** disadvantage of using boiling in softening hard water. (1 mark)

19. The following represents a reaction scheme starting with sodium metal. Use it to answer the questions that follow.



(a) Identify the:

(i) reagent for step I; (1 mark)

(ii) product H. (1 mark)

(b) Write a word equation for the reaction between sodium metal and reagent in step I. (1 mark)

20. Describe how the following substances can be separated from their mixture:

Solids sodium chloride and lead(II) carbonate. (3 marks)

21. (a) Give the meaning of the term 'normal salt' (1 mark)

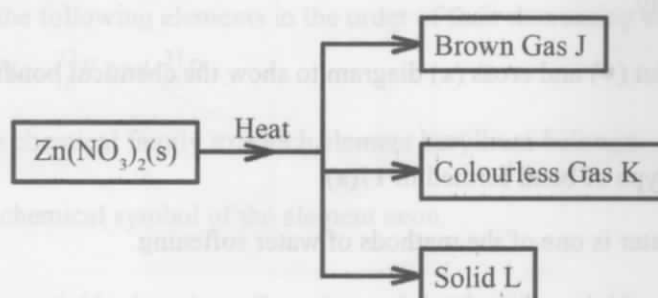


(a) Indicate on the diagram the position of the weight W. (1 mark)

(b) Determine the weight w of the plank. (3 marks)

21. State the reason why walking is easier on a dry road than on a wet road. (2 marks)

- (b) Study the following flow chart and use it to answer the questions that follow.

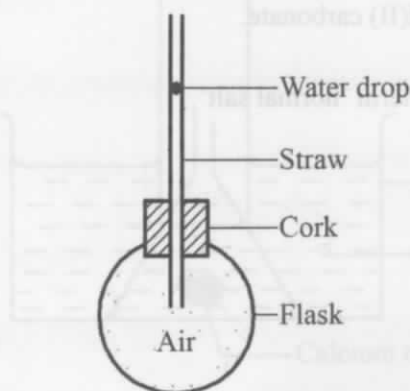


- (i) Identify solid L. (1 mark)
- (ii) Give **one** use of gas K. (1 mark)

### SECTION C: PHYSICS (33 marks)

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

22. A stopwatch used during 100 m race read 0.56 seconds before the start of the race. Determine what the stopwatch read at the end of the race if the race took 10.02 seconds. (1 mark)
23. State the difference between adhesive and cohesive forces. (1 mark)
24. A student looking into fine chalk particles suspended in water using a microscope, observed that the particles move in random motion. State the reason for this observation. (2 marks)
25. (a) **Figure 1** shows a round bottomed flask made of a thin transparent glass containing air. It is tightly fitted with a straw through a cork. A water drop is trapped in the straw as shown.

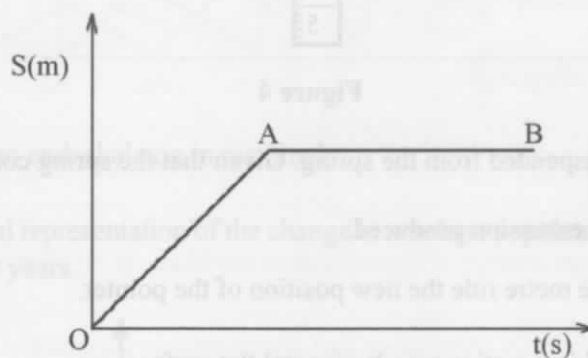


**Figure 1**

If the bottom of the flask is grasped by the palms:

- (i) state what will be observed on the water drop; (1 mark)
- (ii) explain the observation in (i) above. (2 marks)

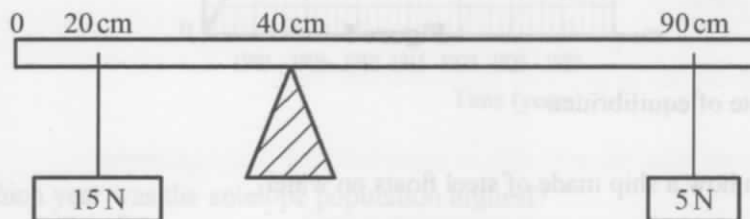
- (b) State **one** advantage of mercury over alcohol as a thermometric liquid. (1 mark)
26. State the meaning of the term *pressure*. (1 mark)
27. A student touched a wooden rod and a metallic rod simultaneously. He observed that the metallic rod felt colder than the wooden rod. Explain this observation. (2 marks)
28. (a) State the SI unit of *displacement*. (1 mark)
- (b) State the meaning of the term *distance*. (1 mark)
- (c) **Figure 2** shows a *displacement – time* graph of a body.



**Figure 2**

Describe the motion of the body from point *O* to *B*. (3 marks)

29. A student observed a mango falling from a mango tree to the ground. Describe the energy changes that occurred on the mango. (2 marks)
30. **Figure 3** shows a uniform plank of weight  $w$  and length 1.0 m pivoted at 40 cm mark. It is balanced by two forces 15 N and 5 N suspended at 20 cm mark and 90 cm mark respectively.



**Figure 3**

- (a) Indicate on the diagram the position of the weight  $w$ . (1 mark)
- (b) Determine the weight  $w$  of the plank. (3 marks)
31. State the reason why walking on a wet smooth floor is more difficult than walking on a dry one. (2 marks)

32. State how heat loss through radiation is minimised in the metallic cooking utensils. (1 mark)

33. Figure 4 shows a helical spring suspended next to a metre rule.

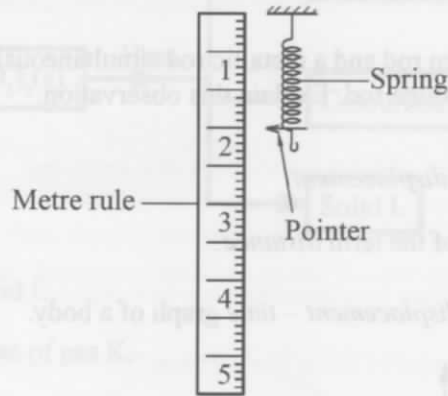


Figure 4

A load of 100 N is suspended from the spring. Given that the spring constant is 50 N/cm:

- (a) determine the extension produced; (2 marks)
- (b) indicate on the metre rule the new position of the pointer. (1 mark)

34. Figure 5 shows an object resting on a horizontal flat surface.

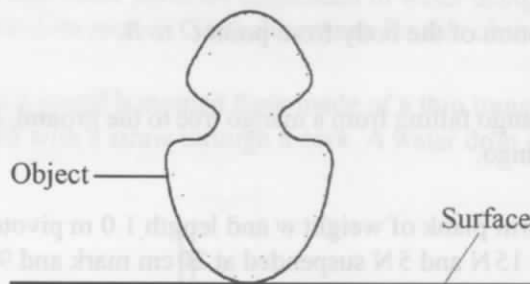


Figure 5

Identify its state of equilibrium. (1 mark)

35. (a) Explain how a ship made of steel floats on water. (2 marks)
- (b) State **two** features of a hydrometer that makes it suitable for its function. (2 marks)