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 Kingdom in which the following organisms are classified. (2 marks)

Organism	Kingdom
(i) Mould, Yeast, Toad stool	
(ii) Euglena, Amoeba, Plasmodium	

(b) Give a reason why excretion is important in living organisms. (1 mark)

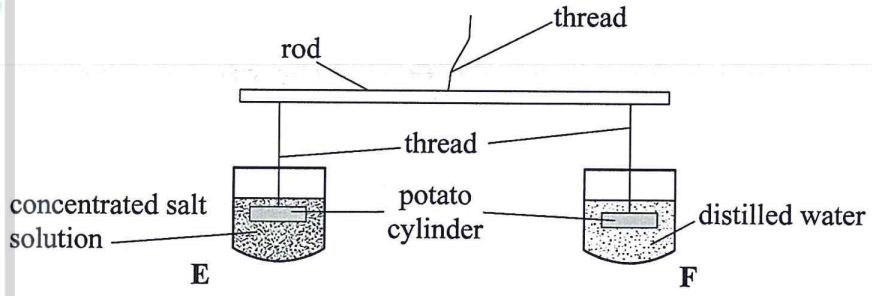
2. (a) Give **one** function of the following organelles: (1 mark)

(i) nucleolus

(ii) golgi bodies. (1 mark)

3. An organelle was found to have a diameter of 4.0 cm under a light microscope. If it was observed under a magnification of X 300,000, calculate the actual size of the organelle. Show your working. (3 marks)

4. Two potato cylinders of equal size were obtained from the same potato tuber. The cylinders were then lowered into two beakers labelled **E** and **F** as shown below. Beaker **E** contained concentrated salt solution while beaker **F** contained distilled water. At the start of the experiment the rod was balanced until it was horizontal.



(a) Give the observation made after 25 minutes. (1 mark)

(b) Explain the observation made after 25 minutes. (3 marks)

5. (a) State the meaning of the following terms as used in animal nutrition:

(i) dentition (1 mark)

(ii) dental formula. (1 mark)

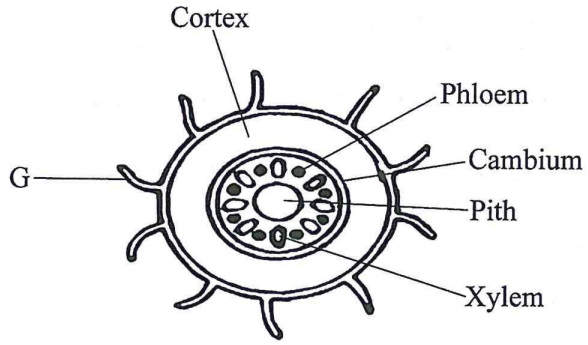
(b) Below is a dental formula of an animal.

$$i_3^Q \quad c_1^1 \quad p_4^4 \quad m_3^2 = 42$$

(i) Calculate the value of **Q**. (1 mark)

(ii) Calculate the total number of molars in the animal's mouth. (2 marks)

6. The figure below represents a transverse section of a plant part.



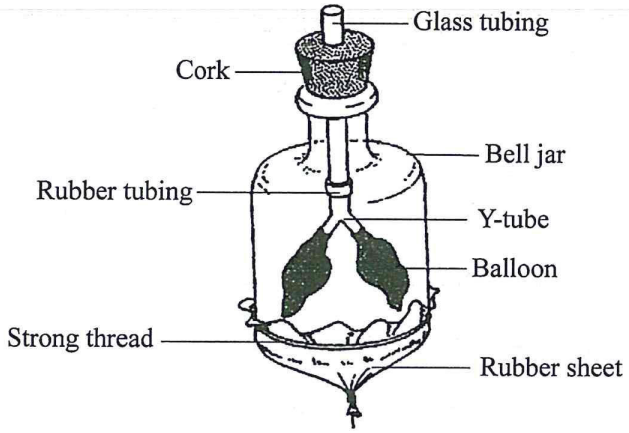
(a) (i) Name the part of the plant from which the section was obtained. (1 mark)

(ii) Name the class of the plant from which the section was obtained. (1 mark)

(iii) Give **one** reason for your answer in (a) (ii) above. (1 mark)

(b) State the function of the part labelled **G**. (1 mark)

7. The diagram below shows a model used by students to demonstrate breathing mechanism in mammals.



(a) State **three** changes expected on the model when it is used to demonstrate inhalation process. (3 marks)

(b) Which part in the mammalian breathing system is equivalent to the rubber sheet in the model? (1 mark)

8. Study the word equation below and answer the equations that follow.

Glucose + Oxygen $\xrightarrow{\text{H}}$ Energy + Carbon (IV) oxide + water

(a) Name the biological process that is represented by the equation (1 mark)

(b) Identify the requirement represented by the letter **H**. (1 mark)

9. Explain **four** expected responses when the human body temperature falls below the normal level. (4 marks)

10. Name **three** excretory products in plants. (3 marks)

SECTION B: CHEMISTRY (33 marks)

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

11. Study **table 1** and answer the questions that follow. The letters do not represent actual symbols of elements.

Table 1

Element	Number of Protons	Number of Neutrons	Number of Electrons
W	3	4	2
X	19	10	10
Y	12	12	12
Z	17	20	17

(a) From the table, identify letters that represent:

(i) A neutral atom of a metal. (1 mark)

(ii) An anion. (1 mark)

(iii) A neutral atom of a non-metal. (1 mark)

(b) Which letters represent elements that belong to the same group? (1 mark)

12. Study the flow chart in **figure 1** and answer the questions that follow.

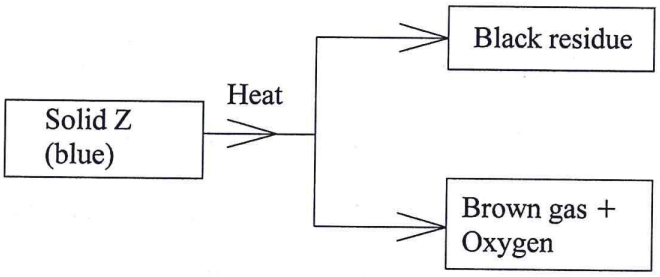


Figure 1

(a) Identify:

(i) Solid **Z**. (1 mark)

(ii) The black residue. (1 mark)

(b) Write an equation for the decomposition of **Z**. (1 mark)

13. A student used the set up in **figure 2** to investigate electrical conductivity of lead(II) bromide.

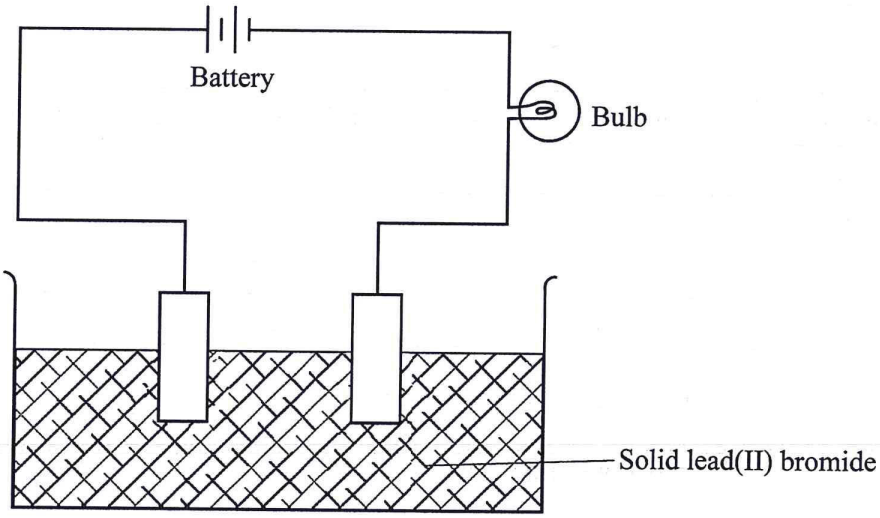


Figure 2

(a) When the switch was closed, the bulb did not light. Explain. (1 mark)

(b) What improvement can be done to the set-up for the bulb to light? (1 mark)

14. (a) The pH value of ethanoic acid is higher than that of hydrochloric acid. Explain. (2 marks)

(b) What is meant by softening of water? (1 mark)

15. **Figure 3** shows the chromatogram of three substances **A**, **B** and **C**. Study it and answer the questions that follow.

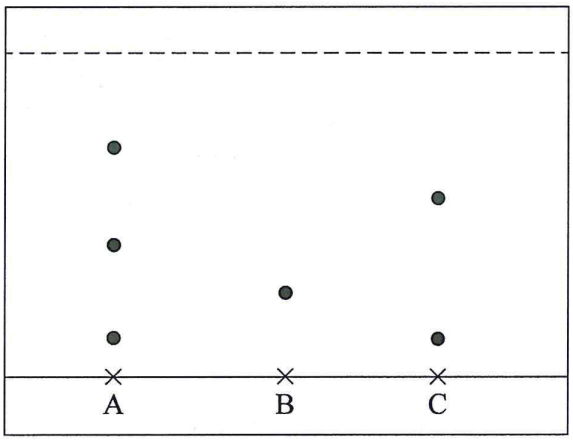


Figure 3

(a) Label the baseline. (1 mark)

(b) From the chromatogram, select a pure substance. (1 mark)

(c) State **one** application of chromatography. (1 mark)

16. Describe how the pH of a soil sample is determined. (2 marks)

17. Metal **X**, atomic number 11, burns in chlorine atomic number 17, to produce a white solid compound **Y**.

(a) Draw a dot (●) and cross (×) diagram to show bonding in compound **Y**. (2 marks)

(b) State **one** use of solid compound **Y**. (1 mark)

18. When a candle burns, the wax melts and after some time, the molten wax solidifies.

(a) State the type of change described. (1 mark)

(b) Give **two** characteristics of the change in (a). (1 mark)

19. **Table 2** shows atomic numbers of elements **C**, **D**, **E** and **F**. The letters do not represent the actual symbols of the elements. Study it and answer the questions that follow.

Table 2

Element	Atomic Number
C	17
D	10
E	11
F	12

(a) Select:

(i) the least reactive element. Explain. (2 marks)

(ii) an element that react vigorously with water. (1 mark)

(b) Write an equation for the reaction between element **C** and water. (1 mark)

20. (a) Study the following equation and answer the questions that follow.

$$CuO_{(s)} + H_{2(g)} \longrightarrow Cu_{(s)} + H_2O_{(l)}$$

(i) Identify the substance which is oxidised in the equation. (1 mark)

(ii) State the property of hydrogen shown in the equation. (1 mark)

(b) State how the purity of water is tested. (1 mark)

21. The diagram in **figure 4** is part of a set up used by a student to prepare and collect oxygen gas.

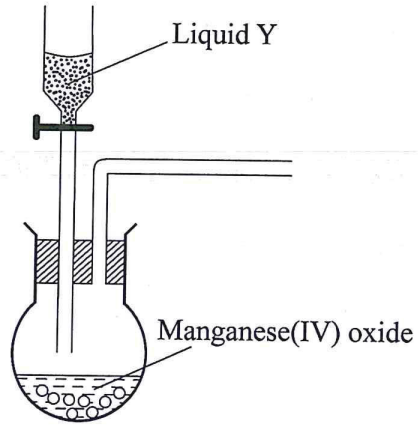


Figure 4

(a) (i) Complete the set up in **figure 4**. (2 marks)

(ii) Identify liquid **Y**. (1 mark)

(iii) State **one** use of oxygen. (1 mark)

SECTION C: PHYSICS (33 marks)

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

22. State **one** branch of Physics. (1 mark)

23. The volume of a piece of metal is 7.5 cm^3. Given that its mass is 85.5 g, determine its density. (3 marks)

24. **Figure 5** shows a capillary tube dipped into a beaker half full of water.

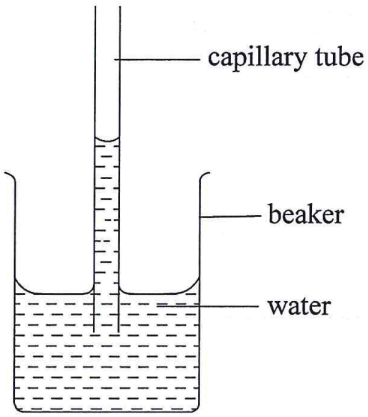


Figure 5

Explain why the level of water in the capillary tube is higher than the level in the beaker. (2 marks)

25. **Figure 6** shows a can full of water. Three holes A, B and C on the side of the can are sealed with plasticine.

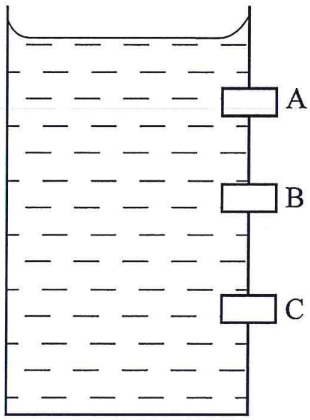


Figure 6

(a) On the figure, sketch the paths of water as it flows from the holes A, B and C when the plasticine is removed. (1 mark)

(b) Explain the answer in (a) (2 marks)

26. Distinguish between the solid and liquid states of matter with reference to the spacing and movement of the molecules. (2 marks)

27. A spring of length 10 cm is stretched by a force of 5 N. Determine the spring constant. (3 marks)

28. A fruit on a tree has potential energy. State the energy changes that take place when the fruit falls to the ground. (2 marks)

29. **Figure 7** shows two stone blocks A and B of same base area resting on a horizontal surface.

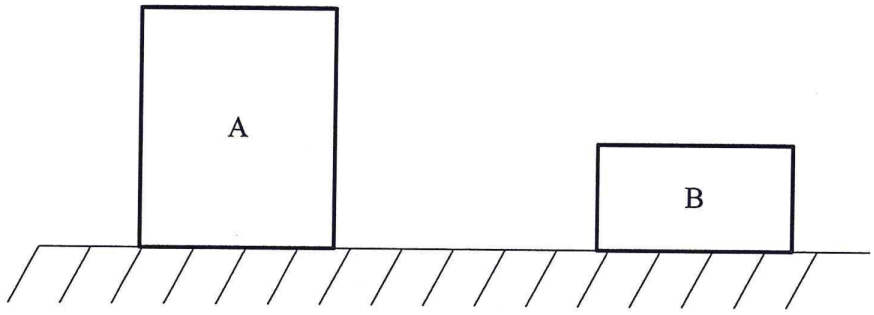


Figure 7

State with a reason the block which is more stable. (2 marks)

30. State **two** features in the construction of a steel bridge that allow for expansion. (2 marks)

31. **Figure 8** shows a velocity – time graph of the motion of a car.

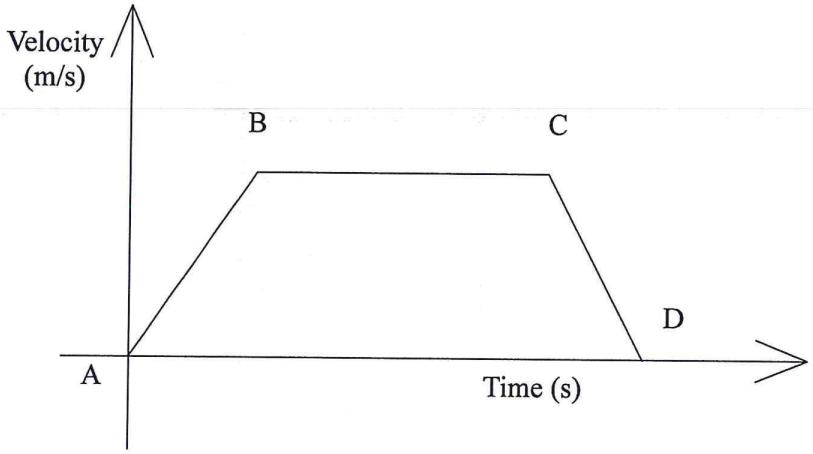


Figure 8

Explain the motion of the car in sections.

(i) AB (1 mark)

(ii) BC (1 mark)

(iii) CD (1 mark)

32. A moment of 12 Nm is required to open a door of width 100 cm. Determine the minimum force required to open the door. (3 marks)

33. What feature in a vacuum flask minimises heat loss by:

(a) Convection (1 mark)

(b) Conduction (1 mark)

(c) Radiation (1 mark)

34. State **two** ways in which friction between two bodies can be reduced. (2 marks)

35. A log of wood of weight 200 N floats on water. Determine the mass of the water displaced by the log. (*Density of water is 1000 kgm^{-3}*). (2 marks)