1 **You are provided with the following materials.**

- Iodine solution in a test tube.
- Distilled water in a beaker.
- A hand lens.
- A scalpel.
- Microscope slide.
- Cover slip.
- Light microscope.
- Specimen **E.**
- A 30 cm ruler.
- White tile.

Procedure

(i) Dip the petiole of specimen **E** in the distilled water provided in the beaker.

(ii) Using the scalpel, cut off about 2 cm of the specimen **E** at the base while holding the cut area under water.

(iii) Immediately transfer the petiole with the freshly cut end into the iodine solution and leave it undisturbed for about ten minutes. Do not discard the iodine solution as you may need it in question 3.

(iv) Remove the petiole from the iodine solution and make a transverse section, about 1 cm from the end that had been dipped in the iodine solution.

(v) Place the cut section on the white tile and observe the freshly cut surface using the hand lens.

(a) (i) Make a labelled drawing of the structures observed from the cut section.

(2 marks)

(ii) Cut several other thinner slices from the freshly cut end of the petiole and observe the thinnest slice using the light microscope. Make a labelled drawing of the image observed.

(5 marks)

b) (i) State the aim of the experiment. (1 mark)

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(ii) Explain the role of iodine solution in the experiment. (2 marks)

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(iii) State why it was advisable to slice the specimen while holding the cut area under water. (1 mark)

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(iv) Why was it necessary to make very thin slices of the specimen for observation under the light microscope? (1 mark)

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(c) Suggest the likely difference in observation if a blunt object was used to make slices of specimen **E** for observation. (2 marks)

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2 You are provided with specimen **F** on a petri-dish, which is an organism belonging to a certain Phylum. Carefully observe it using a hand lens.

(a) Identify the Phylum to which specimen **F** belongs. (1 mark)

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(b) Give **two** reasons for the answer in 2 (a) based on the observable features of the specimen. (2 marks)

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(c) Explain **three** observable features that make the specimen to colonise most habitats. (3 marks)

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(d) State **two** harmful effects of the specimen to humans. (2 marks)

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(e) Account for the difference in the type of growth pattern found in specimen **F** and humans. (4 marks)

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You are provided with the following materials:

- A light microscope.
- Microscope slides and cover slip.
- Specimen **H**, with some organisms grown on it, placed on a petri-dish.
- An optical pin/needle.
- A hand lens.
- A glass rod.
- Iodine solution in a test tube.
- A white tile.
- A test tube.
- A dropper.

Procedure I

(i) Use the hand lens to observe the organisms on specimen **H**.

(ii) Using the pin, gently obtain a few strands of the organisms on specimen **H** and place them on the microscope slide. Stain them with a drop of iodine solution and cover with a cover slip.

(iii) Mount and observe the specimen under low power objective lens of the light microscope.

(a) Draw and label the image observed. **(3 marks)**

(b) (i) State the Kingdom to which the organisms drawn in (a) belong. (1 mark)

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(ii) Give **two** reasons for the answer in b(i) above. (2 marks)

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Procedure II

(i) Using the scalpel, chop off a portion from specimen **H** without the organisms.

(ii) Carefully mercerrate or cut the portion into smaller pieces and gently crush the pieces using a glass rod on a white tile.

(iii) Place the crushed pieces in a test tube.

(iv) Add about 2 ml of distilled water into the test tube containing the crushed portion and shake to form a suspension.

(v) Test for the food substance present in specimen **H** and complete the table. (5 marks)

Test	Procedure	Observation	Conclusion

(c) Account for the likely difference in observation if the food test was done on a fresh specimen **H.** (2 marks)

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(d) Explain why it was necessary to mercerrate the portion. (1 mark)

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