

Session 5

Q2, 9700/33/F/M/20

1. Starch grains from different types of plant differ in size and shape. Some starch grains have rings on their surfaces.

You will now observe and draw starch grains from one type of plant.

1. Put one clean and dry microscope slide onto a paper towel.
2. Using a pipette, put a few drops of S onto the slide. S is a suspension of starch grains.
3. Cover the drops of S on the slide with a coverslip and use a paper towel to remove any excess suspension.
4. Use the microscope to find and observe the starch grains on the slide.

You may need to reduce the amount of light entering the microscope and adjust the fine focus to observe the starch grains clearly.

5. Select, from a single field of view, four starch grains that show different sizes and features.
 - (a)
 - (i) Make a large drawing of the four starch grains that you have selected.

[4]

6. Remove the slide from the microscope and place it on a paper towel.

Fig. 2.1 shows some different types of starch grains and patterns on the surface of the starch grains.

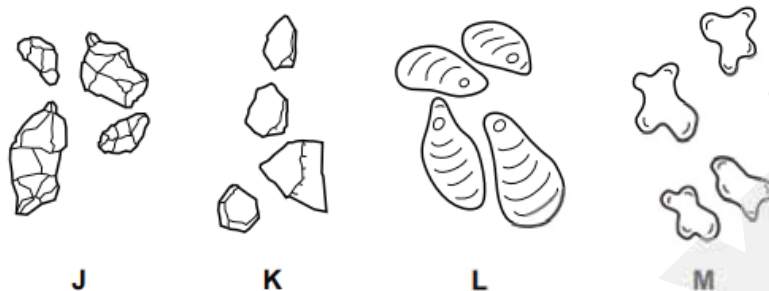


Fig. 2.1

- (ii) Use the diagrams in Fig. 2.1 to identify which of the starch grains, J, K, L or M, matches most closely the starch grains drawn in (a)(i).

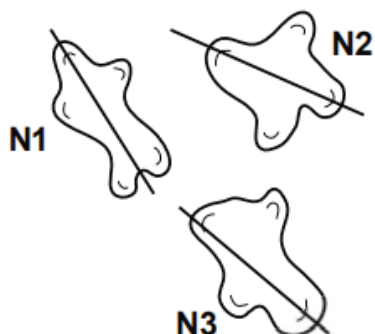
answer [1]

A student calibrated the eyepiece graticule in a light microscope using a stage micrometer scale.

The calibration was:

$$1 \text{ eyepiece graticule unit} = 16\mu\text{m}$$

The student used the microscope to observe and draw three starch grains to the same scale. The student drew a line across the length of each drawing of a starch grain. The student's drawings are shown in Fig. 2.2.


Fig. 2.2

- (iii) Find the mean image length of the three starch grains drawn by the student, along the lines shown in Fig. 2.2.

Show all the steps in your working and use appropriate units.

mean image length = [2]

- (iv) When viewed using the microscope, the student found that starch grain N1 measured 4 eyepiece graticule units along the position of the line drawn in Fig. 2.2.

Use this information and your answer to (a)(iii) to calculate the mean actual length of the three starch grains in Fig. 2.2.

Show all the steps in your working and use appropriate units.

mean actual length = [2]

(b) Fig. 2.3 is a photomicrograph of a transverse section of a plant root containing starch grains. The section has been stained with iodine solution.

You are not expected to be familiar with this specimen.

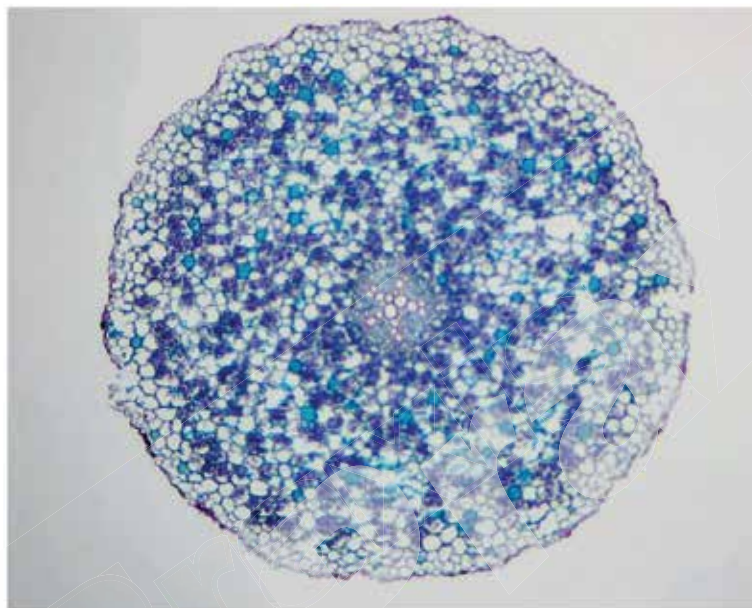


Fig. 2.3

Use a sharp pencil for drawing.

You are expected to draw the correct shapes and proportions of the different tissues.

Draw a large plan diagram of the transverse section of the whole root shown in Fig. 2.3.

Use one ruled label line and label, with the letter G, the tissue that contains most of the starch grains.

[5]

(c) Fig. 2.4 is a photomicrograph of a stained transverse section through a root of a different type of plant.

You are not expected to be familiar with this specimen.



Fig. 2.4

Fig. 2.5 is a photomicrograph of the same root section that is shown in Fig. 2.3