

Key messages

- Candidates should be given the opportunity to experience a variety of practical work throughout the year, in order to develop the skills that can be applied to the requirements of the examination.
- Candidates should be aware that the command word of questions indicates how the candidate should respond. The word 'Describe' requires candidates to state in words (using diagrams where appropriate) the main points of the topic. It is often used with reference either to particular phenomena or to particular experiments. When the question states describe with reference to a named feature in Table 2.1 how the leaf of the hydrophyte is adapted to its environment, the candidate needs to state a feature and the role that feature plays in enabling the adaptation.

General comments

The majority of Centres returned the Supervisor's report with the results obtained and seating plan with the candidate papers. The information included in the **Supervisor's report is essential**, as any problems encountered by the candidates, or instructions which confuse the learners such as in Question 1 (a) – d (ii) to be taken into account when marking the candidates' scripts.

Candidates who have used materials and apparatus during practical work as part of the course are likely to perform better in the examination. Whilst the activities in the examination may not be familiar, candidates who have had the opportunity to follow instructions carefully in a variety of practical work are likely to find it easier to organise and complete unfamiliar activities.

Preparing the correct materials and providing the specified apparatus are essential for the success of the examination. In general, fifty percent of the candidates demonstrated that they had a good understanding of the skills required. There was good discrimination between the weaker and more able candidates and the majority of candidates showed that they were familiar with the use of the microscope.

Comments on specific questions

Question 1

Due to contradicting information in the instructions, only questions (e) - (f) were marked.

- (e) The stronger candidates identified one significant source of error that may have affected the trend in results. One significant error was the reaction time error associated with operating the timer/ removing tubing/fitting the bung. Many candidates correctly stated that the measuring cylinder is not completely full of water at the start of the investigation. The most common errors were stating that the concentration of hydrogen peroxide was weak and candidates also stated the challenges they have experienced during the practical such as stopwatch faulty, test tubes broke and removing the hand from the cylinder.
- (f) The majority of candidates correctly described how the learner would test and confirm the presence of protein by stating the correct solution, the process and end results. The most common error was describing the test for reducing sugar using Benedict's Solution and test for Starch using Iodine Solution and some candidates outlined the experiment on hydrogen peroxide, which they had carried out earlier on in the paper.

Question 2

- (a) (i) The majority of candidates were credited for calculating the correct total magnification. The most common error is that the candidates stated the magnification of the ocular lens only or the objective lens.
- (ii) Credit was awarded to candidates whose drawings were made using a sharp pencil to produce clear, thin unbroken lines which joined up neatly and used at least half of the space provided. Many candidates were able to draw 4/6 cells from the epidermis with double lines representing the cell walls. The most common error was to draw lines that did not meet up precisely, were sketchy, were too thick, smaller, or extremely larger drawings, extending into the text or beyond the line on the right and bottom of the page. Many candidates were credited for showing a cell that was different from the others, often with an inclusion. Most candidates used a label line to show the guard cell and lower epidermal cell.

- (b) (i)** Many candidates correctly measured the length of the stomatal pore and converting to micrometers. The stronger candidates showed the final length of the stomatal pore in a micrometer. The most common errors were candidates failing to get the correct measurement of the stomatal pore, not converting mm to micrometers and failing to show the working in the calculation.
- (ii)** The stronger candidates outlined that both leaf Q and leaf R should be of the same size and should be exposed to the same environmental conditions such as wind speed, light intensity, and humidity. The most common error was that the candidates described the use of the photometer and testing a leaf for starch and they did not specify which leaf's length of stomatal pore should be measured.
- (i)** Fifty percent of the candidates produced a correctly labelled plan diagram. The most common errors were to include cells in the diagram when it should have been a plan diagram and also candidates incorrectly labelled the structure of the part of the leaf.
- (ii)** The stronger candidates have compared the named features of the hydrophyte in Fig. 2.2 with the mesophyte in Fig. 2.3. Many candidates listed at least four observable differences between Fig. 2.2 and Fig. 2.3 such as in terms of the number of stomata Fig. 2.2 has 9 and Fig. 2.3 has 1. The most common error was that candidates switched the observable features.
- (iii)** The stronger candidates described how the named feature of the hydrophyte in Table 2.1 is adapted to its environment and that the number of stomata is for efficient gaseous exchange. Other named features such as the position of the stomata to allow transpiration, size of airspace for buoyancy and waxy cuticle for creating a waterproof layer on the water surface were also credited. The most common error was that some candidates stated the named feature without a description or a description without a named feature. Some stated the wrong description for a named feature.