General Comments

Students found little difficulty in carrying out the instructions to the practical activity, processing their data and plotting an appropriate graph. Task 1, Task 2 and the Written Test all produced a good range of marks. Although Task 2 was straightforward and differed little from previous examinations, many students still made errors with calculations, labelling headings of tables and plotting graphs.

Task 1

This paper scored more highly overall than in some previous years. There was opportunity to demonstrate knowledge and skills and the majority of students scored highly on many of the questions, with the exception of Questions 4 and 5.

Label

Many students correctly identified the region of most intense colour. Some students failed to follow the instruction to use a label line and added the letter X to a vascular bundle. As long as it was clearly and correctly placed, they gained credit.

Question 1

This question scored highly. Cohesion-tension and root pressure were the two most common responses.

Question 2

Very few students failed to gain this mark, either making correct reference to allowing light to pass through, or to see the colour of the dye.

Question 3

Nearly all students could correctly identify xylem as the tissue that moves water through the plant.

Question 4

Most students could describe the correct calculation, or state the formula, to gain one mark. However, many failed to go on to give a full description by stating that it is necessary to first measure the line (P–Q). In many cases, this prevented students gaining both marks.

Question 5

This was the most discriminating question on Task 1. Very few students achieved full marks. Marking point 1 was often not awarded because students failed to provide a description of how to measure the distance moved. Good suggestions included waiting until the dye reached the top and recording both the time and distance or after a set time, slicing the celery until the point is reached where the dye can first be seen and recording the distance. Others only had the idea of setting or recording time and then some could correctly go on to describe how to calculate rate of movement.
Question 6

This was answered correctly by the majority of students. Despite the fact that the strip had been removed from the dish, a common error related to the idea that water could still be absorbed. There were also occasional incorrect references to diffusion or osmosis, rather than to capillary action.

Task 2

Question 7

Tables were generally clear and well presented. It was very rare to see use of rows rather than columns used for the variables. Almost all students had concentration of salt solution in the first column. If marks were not awarded, it was usually because the student failed to describe fully the distance moved by the solution and/or concentration of salt solution. This was necessary to gain marking point 1. A few students incorrectly entered units in the body of the table as well as in the heading. A small number of students failed to take repeat readings.

Question 8

Many students failed to gain full marks on this question. Incorrect rounding of the mean value led to a failure to obtain the first mark. The commonest rounding error was, for example, to round 14.66 to 14.6, instead of 14.7. Some students failed to label the $y$-axis as mean distance moved by the solution, despite being instructed to plot their processed data. Plotting errors were also found. There were some cases of non-linear $x$-axis scales, inaccurate best fit lines or inappropriate extrapolation of the graph curve.

Written Test: Section A

Question 9

Fewer than half the students gained full marks. A number of incorrect responses had distance travelled in the empty column heading, instead of volume of water. Other students struggled with the calculation of the concentration of salt solution.

Question 10

(a) Only a small number of students scored highly on this question. A surprising number scored no mark at all. Correct responses either made reference to the capillary tube being thin/narrow, or continuous/hollow. Very few answered that it is non-living or that no respiration/ATP is involved. Some responses referred to it simply being ‘dead’ and this was not given credit.

(b) This question also discriminated across the range of marks. Common correct responses related to the fact that there is no root pressure or transpiration. A smaller number referred to xylem vessels having a different diameter, or having different adhesion of water to the sides. Some students went on to describe cohesion-tension, which did not gain any marks.
Question 11
Students who understood the question gained the mark, but others simply referred to allowing time for capillary action to occur.

Question 12
(a) Few students scored a mark by stating that intermediate values could not be predicted. A common incorrect answer was that there were not enough results.

(b) If marking point 1 was not gained, it was because students did not state that an increase in (salt) concentration had a greater effect on celery. Fewer students obtained marking point 2 by going on to qualify that the effect being greater in celery applied only up to a salt concentration of 0.88 mol dm\(^{-3}\).

Question 13
Some students had the idea of mass transport involving movement around the plant and gained credit. Others had some knowledge of the term ‘bulk movement’ but many did not understand that it involved the movement of more substances than just water. Many students failed to score a second mark if they only referred to movement of water.

Written Test: Section B

Question 14
Very few students failed to score the mark on this question.

Question 15
Very few students scored two marks here. Few used the term ‘confounding variable’, which made it necessary to explain the concept; weak powers of expression meant that these explanations often failed to be creditworthy. Better answers often scored on marking points 3 and/or 4.

Question 16
Very few students failed to score the mark on this question. It was rare to come across a spelling error.

Question 17
This question produced a full range of marks. Some students referred to the effect of watering on the concentration of salt in the soil, rather than the effect on yield. It was clear from the responses which students had carefully studied the resource and clearly understood the effects of the different watering treatment.
Question 18

This question produced the whole range of marks. Some students simply repeated what they had written in the previous question. Many students could come up with the fact that irrigation with sea water increases the salt concentration in the soil. A few students correctly went on to relate this to lower water potential in the soil and linked this to a reduction in water uptake. Only a small number of students then considered the effects of this watering being repeated every year. This resulted in fewer responses relating to marking points 3, 4 and 5.

Question 19

This question scored well. Only a small number of students compared other people’s diet instead of one person on different days.

Question 20

The responses were variable. If a mark was scored, it was invariably for marking point 1 (blood pressure values given as percentage of population). Just less than half the students scored this mark. Incorrect responses often stated ‘Yes’, or others simply referred to the fact that a mean was calculated.

Question 21

Answers to this question produced the whole range of marks. The better responses covered marking points 1, 2 and 5. Weaker responses at least had the idea that another factor could cause the results. Some students referred to a correlation but failed to describe it in further detail. It was rare to come across marking points 3 or 4.

Questions 22 (a) and 22 (b)

These questions resulted in a low proportion of correct responses, particularly 22(b), perhaps because this type of question had not been asked previously. There was a general lack of understanding of how to deal with anomalous results. The concept of a result being part of the sample unless there was a systematic error in the method, or the method was different from that used in other studies, was not understood by many students.

Question 23

Some students correctly linked high salt intake with high blood pressure and heart disease. Better responses linked this to atheroma and/or clots or blockages in the coronary arteries. Weaker responses included vague references to high blood pressure causing ‘strain on the heart’, or the heart having to ‘work harder’. Some students incorrectly linked salt intake to high cholesterol levels.
Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator www.aqa.org.uk/umsconversion