6116
Paper 3

GENERAL COMMENTS

Candidates seemed able to attempt all questions with no indication of a shortage of time. Some answers were left blank, and this seemed to be through lack of knowledge rather than lack of time. There were parts of some questions based on investigative and planning skills, which some candidates found difficult and perhaps require further practice.

Candidates should be made aware of the differences in responses that they should make when questions involve terms such as describe and explain. One of the problems seemed to be candidates giving descriptions when explanations had been requested or just describing or explaining and not both.

Misunderstandings and errors arose from candidates not taking time to read questions carefully and answering what they thought the question asked rather than what was actually required. The golden rules of following instructions and being guided by the syllabus and by the mark allocation on the question paper should always be applied.

Candidates may perform better if they try to give, for example, three distinct points in their answer to a question carrying three marks. It would appear that weaker candidates are satisfied having given one fact, when three were required. Candidates should be taught to target the length of their response and the number of response points given to the number of marks available.

Candidates need to be able to demonstrate general mathematical skills, such as manipulating formulae and substituting numerical values into formulae (see Mathematical Requirements in the Specification Appendix), in addition to the specific mathematical skills detailed in the specification for each unit. While these latter skills might be expected to feature regularly in the assessment of each unit, calculations will also be set that require candidates to demonstrate general mathematical skills.

COMMENTS ON INDIVIDUAL QUESTIONS

1 (a)(i) and **(ii)** Calculation of total surface area

Learners failed to work out the total surface area although the formula was given.
This could be caused by a lack of mathematical skills.

- Simple algebraic calculations need attention.
- BODMAS rule needs to be emphasized

Answer

(i) Total surface area = 2YZ + 2XY + 2XZ
= 2(3X2) + 2(2X3) + 2(2X2)
= 12 + 12 +8;
= 32cm^2;

(ii) The answers to this question revealed that candidates did not read their questions properly. Many candidates got the correct answer to question 1 (a)(i) but did not succeed to bring 2YZ in relation to the total surface area of the top and bottom of potato chip B.

Potato chip	Length of X/cm	Length of Y/cm	Length of Z/cm	Total surface area of top and bottom/ cm2 **(2YZ)**	Total surface area of four sides/cm2 **(2XY + 2XZ)**	Total surface area of chip/cm^2
B	2	3	2	**12**	**20**	**32**

(b) The question was about the influence of surface area on the intake of water.

The majority of candidates mentioned that potato chip B is bigger but did not mention the surface area.

Answer

(i) A has greater surface area;
more water absorbed/ moved into potato;

(ii) Candidates who had carried out this type of practical were able to offer an explanation involving osmosis and the diffusion of water out of the cells of potato chip B.
Some candidates answered with reference to the 'passage of water molecules from a region of their higher concentration to a region of their lower concentration', or some referred to the concept of water potential gradient.
The direction of movement out of the cells needed to be clearly expressed.
Although there were many excellent answers, some candidates need to be clear about these concepts and to identify the direction of movement of the water molecules.
Candidates are often confused over terms such as turgid, plasmolysed, flaccid, hypertonic and hypotonic.
Many answers included the definition of osmosis and were penalized.

Answer

(cells) lose water/ become plasmolysed;
(Water moves out by) osmosis;
from higher water potential to lower water potential;

(c) Candidates mentioned the correct reagent but failed to describe how the test should be carried out.

Answer

add iodine solution;
Blue-black colour indicates presence of starch;

2 (a) (i) The question was accessible to candidates of all abilities.

Answer

to keep leaf peel flat;
to keep leaf peel in place;
to protect the (objective) lens;
to protect the specimen;

(ii) This was a very challenging question.

The syllabus requires that candidates should have had experience in the preparation of temporary mounts, suitably stained if necessary, for examination with a microscope. Few candidates could explain why the leaf peel rather than the whole leaf was viewed with a microscope.

Answer

leaf peel is thin/ ORA + to allow light to pass through/ to identify stomata;

(b) This proved to be the most difficult question on the paper. Only the best candidates could gain high marks on this question. It separated candidates who understood the question from those who had learned the functions of the different parts of a microscope by rote.

Answer

2 (b) Any two linked pairs from:
Adjust focus of microscope;
To see cells clearly/greater resolution;
OR
Select a higher power lens;
To increase magnification;
OR
Change/adjust light intensity;
To increase brightness;

(c) (i) Candidates had no difficulty in counting the stomata

(ii) Fig 2.2 shows a micrograph of the underside of a leaf magnified 350 times. Candidates were requested to calculate the actual length in micrometer of structure S.

This question was not well answered by many candidates. Candidates did not take the magnification of the figure into account and just convert the size of the structure to micrometer. Some candidates also confused the actual size with magnification so gave an answer 'x…', although the unit was given.

Answer
(i) 9/nine;

(ii) Actual Size = (Image size (with ruler) ÷ Magnification) x 1000;
= (6 mm-13 mm ÷ 350) x 1000;
= 0.017- 0.03714 mm x 1000;
= 17- 37.14µm;

OR

Actual Size = (Image size (with ruler) x 1000) ÷ magnification;
= (6 mm-13 mm x 1000) ÷ 350;
= 6000 – 13000 mm ÷ 350;
= 17- 37.14µm;

3 **(a)** This question was about the action of amylase on starch.

The majority of candidates only mentioned that starch was present or absent but failed to give the reason.

Answer

Test tube	Colour observed	Explanation
A	Blue	Starch present + no amylase/enzyme to work on/digest starch;
B	Brown	No starch + amylase act on starch/change starch to a simple sugar;

(b) **(i)** During the planning of investigations, candidates are required to distinguish between independent, dependent and constant variables. Many candidates also explained what is meant by controlled variable instead of naming the variables in the investigation that should be controlled.

Answer
volume/concentration of starch solution;
volume/concentration of iodine solution;

(ii) & **(iii)** These questions were poorly answered. Candidates know the effect of temperature on enzyme activity but couldn't apply it to the questions at hand.

(ii) enzymes become inactive at low temperatures + do not act on starch;
(iii) Result: contents turn blue-black;
Explanation: enzymes denatured (at high temperatures) + will not act on starch;

(iv) Many candidates managed to score 2 marks. Many candidates didnot mention the reagent used for the test for reducing sugars even though they know the expected results.

Many answers included the use of Benedict's solution and were penalized; the question wants a description of the test.
The spelling of "Benedict's" was a challenge to many candidates.

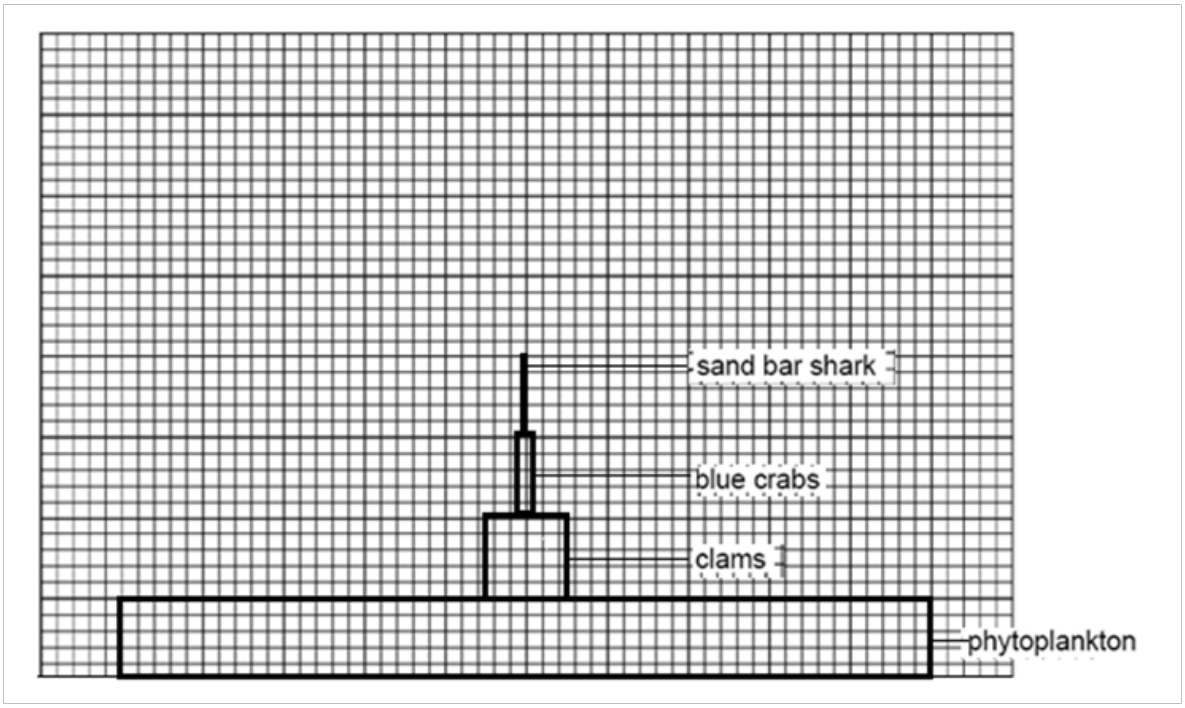
Answer
add Benedict's solution to the test tube;
heat in water bath;
yellow, orange or red colour will show that reducing sugar is present;

4 (a) (i) The question was accessible to candidates of all abilities

Answer
125 × 0.64 = 80 kg;

(iii) Many candidates drew line graphs and bar graphs. There was evidence that many candidates were introduced to pyramids of biomass. The most common mistake made was the proportion mark. The pyramid should show a more or less true reflection of the biomass of the different organisms especially if we look at the big difference between the biomass of phytoplankton and the biomass of the clams.

Answer
4(a) (ii) S - pyramid shape;
L- Labels;
P - proportion;



(iii) The syllabus requires mathematical skills. It is stated clearly that learners should be able to use averages, decimals, fractions, percentages, ratios and reciprocals.

Many candidates only work out 9% of the energy contained in phytoplankton.

Answer

4(a)(iii) 4237.80 x 9.5%		9.5÷ 100 x 423780;
= 40259.1	OR	= 40259.1;
= 40259 kJ		= 40259 kJ;

(b) This question revealed how little knowledge or understanding candidates had about the external features of groups named in the syllabus, as they were unable to describe three visible features of crustaceans.

Answer
2 body parts/cephalothorax and abdomen;
2 pair of antennae;
Claws/pinchers;
5 pairs of legs;