BIOLOGY

Paper 0970/12
Multiple Choice (Core)

Question Number	Key	Question Number	Key
1	C	21	C
2	A	22	A
3	A	23	B
4	B	24	C
5	B	25	D
6	B	26	C
7	B	27	B
8	D	28	C
9	D	29	B
10	D	30	B
11	C	31	B
12	B	32	C
13	C	33	D
14	D	34	B
15	D	35	D
16	B	36	C
17	D	37	B
18	B	38	A
19	C	39	C
20	A	40	C

General comments

The exam paper provided both a balance of questions and challenge for candidates working at this level. There was uncertainty about the level of organisation of a leaf; the identification of a sensory neurone in a reflex arc; that implantation occurs in the uterus and the site of fertilisation in a flower. Most candidates were able to recognise a root hair cell, understood what precautions could help to prevent the spread of AIDS, and that alcohol is broken down in the liver. The definition of inheritance was well-known, as was the determination of sex. What is involved in genetic engineering was also well-known.

Comments on specific questions

Question 1

Although this question was well-answered by the majority of candidates, some incorrectly believed that the release of energy from nutrient molecules within cells is nutrition.

Question 2

Many candidates appreciated that the rats are from the same genus. Although some incorrectly believed that the rats were from the same species.

Question 3

While some candidates correctly identified the arthropod as an arachnid, since it only has four pairs of legs, over half the cohort incorrectly opted for one of the other groups, in particular crustaceans.

Questions 5

This proved to be a challenging question with many not appreciating that a leaf is an organ.

Question 6

While many candidates were able to derive the correct answer, some divided the magnification by the image size of the nucleus.

Question 7

Although many candidates appreciated that diffusion is involved in the movement of carbon dioxide and oxygen into and out of a mesophyll cell, some opted for one of the incorrect distractors.

Question 8

While many candidates identified that the glass tube where the solution had moved up the most was the correct answer, some incorrectly opted for the glass tube where the solution had moved up the least.

Question 9

Although this is fundamentally a food test question, the problem-solving element proved to be challenging for many, with only some opting for the correct answer.

Question 10

Many candidates correctly identified the correct answer but some found this challenging.

Question 11

While some candidates appreciated that the test-tube that contains the photosynthesising plant will have a decrease in the carbon dioxide concentration, many opted for one of the distractors.

Question 12

Many candidates correctly identified the xylem, although some could not distinguish between the xylem and phloem.

Question 14

While many candidates appreciated that amino acids are produced by protease from the stomach, some candidates incorrectly believed that amino acids are produced by amylase from the salivary glands.

Question 15

Many candidates identified the correct answer.

Question 16

Many candidates were able to derive the correct answer, although some candidates incorrectly concluded that the shoot with no leaves would lose more water.

Question 17

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While many candidates were able to derive the correct answer, some were unable to work out which blood vessels carry oxygenated blood.

Question 18

This question was well-answered by most candidates, although some believed that a disease-causing organism is the definition of a bacterium or virus.

Question 19

Many candidates were able to work out how the curve changes after vigorous exercise, although a similar number did not appreciate that both the volume and frequency of breathing increase.

Question 20

This was a well-answered question, although some candidates did not appreciate that getting rid of carbon dioxide is excretion.

Question 21

Many candidates appreciated that urine concentration would increase and that the volume of urine would decrease immediately after exercise.

Question 22

Some candidates were able to identify the sensory neurone in a reflex arc.

Question 23

Many candidates appreciated that the central nervous system consists of the brain and spinal cord, although a large majority of candidates incorrectly believed that it consists of the brain, spinal cord and peripheral nerves.

Question 24

This was a well-answered question with most candidates appreciating that alcohol is broken down in the liver, although some candidates incorrectly opted for the kidneys.

Question 25

Identifying the site of fertilisation in a flower proved challenging for most candidates.

Question 26

While many candidates correctly appreciated that implantation occurs in the uterus, some incorrectly believed that the site of implantation is the oviduct, ovary or the vagina.

Question 28

Some uncertainty existed as to when a woman is most likely to become pregnant.

Question 29

The majority of candidates gave the correct response to this question.

Question 31

This was a challenging question, with few selecting the correct response to this question. Similar numbers selected each option.

Question 32

This question was well-answered.

Question 35

Many candidates were able to identify the correct arrow. A common error was to select the arrow that shows carbon dioxide leaving the plants.

Question 39

Many candidates appreciated that increased flooding is a negative impact on the environment, caused by deforestation. Common incorrect responses were a 'decrease in land for livestock production' and 'decreased levels of carbon dioxide in the air'.

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Paper 0970/22
Multiple Choice (Extended)

Question Number	Key	Question Number	Key
1	D	21	A
2	B	22	C
3	B	23	B
4	B	24	C
5	B	25	B
6	C	26	D
7	D	27	C
8	C	28	D
9	D	29	C
10	A	30	B
11	C	31	B
12	A	32	B
13	C	33	B
14	D	34	D
15	D	35	B
16	A	36	D
17	D	37	B
18	B	38	D
19	A	39	D
20	C	40	D

General comments

The exam paper provided a good balance of questions and challenge for candidates working at this level. Many topics were well-understood by the majority of candidates. Some topics that proved more challenging. These included; the definition of respiration, the characteristics of Fungi and Protoctists, eutrophication and the level of organisation of a leaf.

Comments on specific questions

Question 1

Although this was generally a well answered question, some incorrectly believed that the detection of a change in blood temperature is called respiration.

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Question 2

This proved to be quite a challenging question with many opting for an incorrect answer. The features of Fungi and Protoctists were not well-known by all.

Questions 3, 5, 10, 13, 14, 15, 22, 26, 29, 30, 33, 34 and 35

The majority of candidates gave correct responses to these questions.

Question 4

Many candidates knew that a leaf is an organ. The commonest incorrect responses were 'tissue' or 'cell.'

Question 7

Although this is fundamentally a food test question, the problem-solving element proved to be challenging for some.

Question 11

Although this was a well answered question with many candidates appreciating that the test-tube that contains the photosynthesising plant will have a decrease in carbon dioxide concentration, some opted for one of the distractors.

Question 12

Many candidates correctly identified the cells as epidermal cells. Some incorrectly believed these to be palisade cells. This option should have been eliminated by the fact that there were no chloroplasts present.

Question 16

Although this was a challenging question it was reasonably well-answered.

Question 18

Many candidates identified the correct answer. Some incorrectly believed that the valves worked the opposite way round, i.e. the atrioventricular valves opening and the semilunar valves closing.

Question 20

Although this question was well answered, some candidates did not seem to appreciate that both the volume and the frequency of breathing increase.

Question 21

This was a well answered question, although some candidates did not appreciate that getting rid of carbon dioxide is excretion.

Question 23

Many candidates appreciated that the central nervous system consists of the brain and the spinal cord, although some incorrectly believed that it consists of the brain, the spinal and peripheral nerves.

Question 24

Many candidates were able to correctly identify which statement explains the results, but many found this challenging.

Question 27

While this question was well answered, some opted for incorrect distractors. Some candidates incorrectly believed that sperm cells have a jelly coat present.

Question 31

This question was well answered. Although some did not appreciate that mitosis results in the same number of chromosomes in the daughter cells as the parent cell.

Question 32

Many candidates gave the correct response, although some did not seem to appreciate that co-dominance is involved in this question.

Question 36

Although many candidates gave the correct response, many could not identify denitrification on the nitrogen cycle diagram.

Question 37

Many candidates correctly identified the role of the rotating blades in a fermenter.

Question 39

Similar numbers of candidates opted for a correct answer and an incorrect distractor. Some candidates did not appreciate that it is the increase in organic matter from the death of producers that causes an increase in bacteria.

BIOLOGY

Paper 0970/32
Theory (Core)

Key messages

The majority of candidates showed a good understanding of many topics including the carbon cycle, farming and pollution. Some were less secure in their knowledge of inheritance and the process of tooth decay.

General comments

There were some excellent papers produced which showed a good knowledge and understanding of many areas of the syllabus.

Comments on specific questions

Question 1

The majority of candidates gave the correct response.

Question 2

(a) (i) Most candidates provided a correct response for dish **B**. Fewer gave the correct response for dish **A**. The main misconception was that light was necessary for germination to occur.

(ii) Many candidates appreciated that the seeds would germinate as they had both water and a suitable temperature, but that growth after germination would be severely limited as the germinated seeds would be unable to photosynthesise.

(b) (i) It was pleasing to see that most candidates were able to calculate the correct percentage. Fewer gave their answer as a whole number as instructed.

(ii) This was well-answered by the majority of candidates. The most common correct responses made reference to a lack of resources, such as not enough water being present for the germination of all seeds.

Question 3

Many found this question challenging. Most knew that plants store glucose as starch and that cellulose is made of glucose but glycogen and the elements found in fats and proteins were not well-known.

Question 4

(a) Most candidates gave the correct positions of incisor and molar teeth.

(b) (i) Many candidates gave the correct response. The commonest error was to quote the number of decayed teeth rather than the number of teeth lost.

(ii) Nearly all candidates gave the correct value.

(iii) Most responses provided a plausible reason for the difference in the number of decayed teeth. A few responses did not make it clears as to whether they were referring to person **A** or to person **B**.

(iv) Almost all candidates correctly identified the molar teeth.

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(c)   Some candidates provided a correct response to this question but many found it challenging. The best responses made the link between bacteria respiring sugars to produce an acid which then dissolves the tooth enamel. The commonest misconception was that the bacteria directly destroy or 'eat' the enamel.

Question 5

(a) (i)   The oesophagus and the pancreas were well-known.

(ii)   Most candidates could identify the small intestine as the place where digested food is absorbed. Some correctly identified where faeces is stored but few could identify the small intestine as the site where most of the water absorbed. It was a common misconception that the colon absorbs the most water. The colon absorbs some water to produce semi-solid faeces, whereas the small intestine is constantly secreting and absorbing water.

(b) (i)   Some candidates gave the correct response. Common incorrect responses were absorption, digestion and nutrition.

(ii)   Few correct responses were seen and the term *egestion* does not seem to be widely known. The most common incorrect response was excretion.

(c) (i)   Some candidates gave good detailed responses to this question. A common error was to describe the increase in the rate of reaction from pH 4.5 to pH 8.4 but then, instead of describing the subsequent decline in the reaction rate they gave a reason for the decline so that the description was incomplete. Some also stated that there was an optimum pH for the reaction but did not state what that value was. Few gave a data quote involving information from both axes.

(ii)   This was well-answered by candidates.

Question 6

(a) (i)   Most could identify the zygote.

(ii)   Many candidates identified the correct process. Common errors included; meiosis, reproduction and implantation. 'Nuclear fusion' was accepted, but not 'fusion' unqualified.

(iii)   A few responses correctly stated where fertilisation normally takes place. Common incorrect responses were the uterus and the vagina.

(b) (i)   This proved to be a challenging question for many. Common errors seen were the use of sex chromosomes rather than the given alleles **T** and **t**, many seemed unfamiliar with the term *genotype.*

(ii)   Many candidates identified the correct ratio but fewer were able to accurately state all the possible offspring genotypes.

Question 7

(a)   Some responses showed a good recall of the definition of transpiration. The commonest correct words were 'leaves' and 'stomata'. The least well-known was how water vapour moves out of the plant, with many incorrectly stating that it moves by osmosis.

(b)   There were some excellent responses to this question. One error was to select an environmental condition but then to describe the effect of an increase rather than a decrease.

Question 8

(a) (i)   Most candidates gave the correct function.

(ii)   Many candidates were able to provide one adaption, fewer could accurately describe two. Many knew that red blood cells do not possess a nucleus. Some described the shape of the cell correctly but some of the descriptions were unclear. A few referred to the presence of haemoglobin.

(b)   Many candidates gave a correct response.

(c) (i)   Some candidates identified the disease correctly.

   (ii)   The risk factors were well-known, but sometimes stated imprecisely. 'Poor diet' and 'exercise' alone were insufficient.

(d)   Some responses identify all the blood vessels correctly.

(e)   Many responses made correct reference to valves and their function in maintaining a one-way flow. Some responses gave a detailed account of the circulatory system instead of describing *how* a one-way flow was maintained.

Question 9

(a)   Some responses gave a good description of the effects on the wider ecosystem. However, many only described the problems associated with intensive farming which did not answer the question.

(b)   The reasons for using fertilisers and insecticides were well-known by the majority of candidates. A common misconception was that herbicides are used to kill herbivores.

(c)   Most candidates could state two sources of water pollution. A common error was to refer to fertilisers and insecticides which did not answer the question.

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Paper 0970/42 **Theory (Extended)**

Key messages

Some questions require a description or an explanation. The best responses recognise the important points and link them together to give a clear logical account that differentiates between the command words describe and explain.

The use of a ruler when extracting data from graphs will ensure accuracy. It was apparent that some of the lines drawn on Fig. 4.1 in response to **Questions 4(b)(i)** and **(iii)** were not straight making accurate data quotations difficult.

For questions where a limited number of responses are required (e.g. State **one** type of...) only the first response will be considered.

Mathematical skills are often tested in these papers. Only some candidates were able to calculate a percentage change correctly in **Question 4(b)(ii)**.

The differences between sexual and asexual reproduction in plants was not well-understood by all. A common misconception was self-fertilisation is a type of asexual reproduction.

General comments

In general, candidates have followed the advice given in previous reports and indicated where their continuation and rewritten answers were given on the scripts.

Many *described* the results from Fig. 4.1 in **Question 4(b)(iv)**, rather than *explaining* the response shown by person **B**. In **Question 4(b)(iii)** some did not use comparative statements only simple descriptive ones without any appropriate words, such as 'higher' and 'lower' or 'steeper' and 'less steep'.

Comments on specific questions

Question 1

(a)   Many candidates completed Table 1.1 correctly. Common errors were to name the snow goose, pipe fish and water flea as secondary consumers. The snow goose was also identified incorrectly as an animal that feeds at two trophic levels. The muskrat was not a correct answer anywhere in the table, but was given by some candidates for the second and/or third rows.

(b)   Various processes in the nitrogen cycle were given to identify **A** on Fig. 1.2: ammonification, denitrification and nitrogen fixation were the closest to nitrification, which was the correct answer. Many identified bacteria as the type of organism that converts ammonium ions to nitrate ions. Some correctly identified these as nitrifying bacteria. Some qualified the bacteria with the name of the incorrect process given as the answer to the process.

(c)   There were many good descriptions of the active uptake of nitrate ions by root hair cells. Many of these answers were very detailed giving all the points on the mark scheme. There was some confusion about osmosis as candidates stated that minerals are dissolved in soil water which moves into root hair cells by osmosis. Some stated incorrectly that nitrate ions move 'from a high water potential to a low water potential'. Some decided that this was a question about nitrogen fixation and described the uptake of nitrogen gas (dinitrogen) into root nodules and the production of ammonia.

(d)   Few responses stated that ribosomes are the site of protein synthesis (process **D** in Fig. 1.2). Common errors were cytoplasm, xylem, phloem, root nodules and leaves.

(e)   Nitrogen fixation was given as process **B** by some candidates, but many gave other stages in the nitrogen cycle or processes in other cycles such as respiration or combustion.

(f)   Some responses made the key point that energy is lost between trophic levels. However this concept was not well-known. Some were able to give examples of reasons for the energy loss, the most common being that not all parts of the organisms are eaten or digested. Many referred to 'food' or 'numbers' being lost, rather than energy. The majority provided a description of the appearance of a pyramid of numbers rather than an explanation which did not answer the question.

Question 2

(a)   There were many good definitions of the term *allele*. Common errors were definitions of genes or to state that an allele is part of a gene. Some referred to alleles being dominant and recessive rather than answering the question.

(b)   There were many excellent explanations of how a mutation in DNA results in an abnormal enzyme which does not catalyse the reaction shown in Fig. 2.2. The best responses began by stating that the mutation changes the sequence of bases in the gene for the enzyme concerned and that this changes the sequence of amino acids. Many explained that the enzyme molecule changes shape so that the substrate molecule does not fit into the active site. A common misconception was that the mutation changed the amino acid sequence of DNA or the base sequence of proteins. Some responses just stated that the 'DNA was changed' which was insufficient. Some only stated that the mutation caused the synthesis of an abnormal enzyme. A common error was to state that the substrate changes shape rather than the active site.

(c)   Many candidates clearly understood why two sunflower plants with the tall phenotype can have offspring with the dwarf phenotype, but not all used appropriate terminology. Good responses used the terms *heterozygous* and *recessive allele* in concise answers that were occasionally illustrated by a Punnett square or a 'criss-cross' diagram. Incorrect phraseology included 'heterozygous dominant' and 'heterozygous allele'. Many thought that only one of the parents carried the recessive allele. In some cases, Punnett squares were drawn correctly, but the dwarf offspring were not identified. Although many stated that the parents were heterozygous, the fact that the allele for dwarfism is recessive was often not included in the response.

(d) (i)   Most candidates identified the type of reproduction shown by the strawberry plant in Fig. 2.2 as asexual. However, some went on to explain what happens in self-pollination which is a form of sexual reproduction. Good responses stated that mitosis is involved in asexual reproduction and that the offspring are genetically identical to each other and to the parent plant.

  (ii)   The most common disadvantage of asexual reproduction given was the lack of variation. Some responses gave very clear explanations of the consequences for disease. Some stated that if the parent did not have resistance to a particular disease, then none of the offspring would be resistant and they would all be killed if the disease spread. They also made it clear that if the parent had an allele that led to a genetic disease, then all, or many, of the offspring would have the same inherited defect. A common error was to include details of selective breeding which was not relevant.

Question 3

(a) (i)   Many candidates gave a feature of xylem vessels and a suitable explanation. Some responses were not sufficiently detailed, for example stating that there were 'holes' in the xylem vessels but not where the holes were, so it was unclear as to whether they were referring to pits or the end walls of the xylem vessels.

  (ii)   Most candidates knew that transpiration is involved in the movement of water in the xylem, although further explanations often showed limited understanding of the principles involved. Good responses began by explaining that water evaporates from mesophyll cells in the leaves and the water vapour molecules diffuse out of leaves. This led on to refer to the cohesion between water molecules and the concept of transpiration pull. Many stated that cohesion is the attraction between water molecules. Common errors included stating that water moves within the xylem vessels by osmosis and making references to water concentration rather than water potential.

(iii) Many candidates knew that xylem vessels provide support for plants. Some did not read the question carefully stating that xylem vessels transport minerals. Other incorrect responses included the anchorage of plants and the xylem being a site for storage.

(b) Many candidates gave a good explanation. Some incorrectly referred to 'stomata cells opening'.

Question 4

(a) Most candidates gave the correct definition. Common errors included giving examples rather than a definition or the stating the difference between hormonal and nervous communication.

(b)(i) Most candidates gave the correct values. A common error was to give the value for **B** in the **A** answer line and vice versa.

(ii) Some candidates gave the correct value for the percentage increase but many found this challenging. Most read the figures from the graph correctly but then were unsure of the next step. Often, values below 100% were seen as the smaller number had been used for the numerator. Some calculated a percentage greater than 100% but then subtracted it from 100 to give the percentage increase. Not all knew that percentage increases can be much greater than 100%.

(iii) Only the best responses made comparisons between **A** and **B**. Many only gave a description without any comparison. It was quite common for responses to include comments about the readings for the first 60 minutes that includes the time *before* drinking the glucose solution.

(iv) Explanations of the results of the glucose tolerance test for **B** generally dealt with the role of insulin in the conversion of glucose to glycogen. Many candidates were careful over their spelling of glycogen although some spellings were too close to glucagon to be accepted. Some explained that glucagon was responsible for the decrease in blood glucose concentration. Many did not follow the command word and wrote a lengthy description of the changes shown in Fig. 4.1 which did not answer the question. A common error was to state that the liver releases insulin and that the brain detects the rise in glucose concentration and instructs the pancreas to release insulin. It is the pancreas itself that monitors blood glucose, although some credit was given for the idea of 'detection' even if the brain, or other organ such as the liver, was given as the organ concerned.

(v) Many candidates gave three symptoms of Type 1 diabetes.

Question 5

(a) There were many good descriptions of the appearance of the three blood cells. Most wrote about the lack of nuclei in the red blood cells and the appearance of the nuclei in lymphocytes and phagocytes although the descriptions were not always accurate. Some commented on the shapes of the cells rather than the nuclei possibly because they did not recognise the nucleus within the lymphocyte or phagocyte. The accounts of the functions of these three cells were good and many excellent responses were seen for this question. Not all could recall the role of red blood cells.

(b)(i) Most candidates completed the flowchart correctly. The spelling of fibrinogen was not always correct. A common error was to give the two substances the wrong way round.

(ii) Almost all candidates gave two correct roles of blood clotting. One error was to describe problems that occur as a result of a blood clot rather than the role of blood clotting.

(c)(i) Most candidates gave the correct responses. A minority gave the phenotypes instead of the genotypes. Common errors included identifying all three as female, omitting the sex chromosomes entirely or writing an allele against the Y chromosome, e.g. $X^H Y^H$.

(ii) Common incorrect responses to this question were 0 per cent, 33 per cent, 50 per cent, 3:1 and 1:4. However, many completed a genetic diagram in the space provided to find that the answer is 25 per cent or a quarter. Some arrived at the correct answer even though their diagrams showed that they had assumed that the gene for blood clotting is not on a sex chromosome.

(iii)   Definitions of *sex-linked characteristic* were not as good as those for *hormone* in **Question 4(a)**. Many responses gave definitions of features that are shown *only* by one sex. These are known as sex-limited characteristics. The most common error was to omit the statement that sex-linked characteristics are controlled by genes on a sex chromosome, X or Y. Some candidates referred to sexually transmitted infections or secondary sexual characteristics that arise during puberty.

Question 6

(a) (i)   Some candidates gave correct features of reptiles. Responses often gave features that are characteristic of all vertebrates or of all quadrupeds. Many knew that reptiles lay eggs, but did not qualify this by stating that the eggs are leathery or do not have hard shells. Fish (and birds) also have scales and so scales alone was insufficient.

(ii)   Most candidates gave two correct responses for this question. Chloroplasts and cell walls were the most common features given.

(b) (i)   Most candidates gave the correct enzyme. Maltase and protease were seen occasionally and a few candidates gave lipase or pepsin.

(ii)   The majority of responses were correct. The liver, stomach and pancreas were the commonest incorrect answers.

(c)   This question was well-answered by majority of candidates. It was good to see some refer to seed banks, but the majority concentrated on ways that are suitable for conserving animals rather than plants. It could be argued that the conservation of plant species is more important to the future of the biosphere than the conservation of animals. Some responses referred to breeding but either did not further qualify it as captive breeding or incorrectly went on to discuss selective breeding. Selective breeding would not be appropriate for the conservation of a wild species as one aim is to increase genetic diversity of each species, not to decrease it.

(d)   Many good examples of resources were given.

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Key messages

There were many excellent scripts with accurate, thoughtful responses, which were clearly and logically produced.

Instructions to give an answer to the nearest whole number, or to one decimal place, should be followed.

General comments

Many candidates would find it helpful to draw tables, diagrams and graphs in pencil. Mistakes can then be rectified and necessary additions made very easily.

It is important for candidates to realise that when an investigation is planned, at least three sets of results should be obtained.

When asked to state a relevant safety precaution for an investigation, the precaution should be specific to the investigation in question.

A successful plan for an investigation shows how the independent variable will be changed, how the dependent variable will be measured and how other variables will be kept constant. It is also usual to plan to take three sets of results (i.e. first set of readings is repeated twice more). The number of repeats or trials should be specified in the plan.

Comments on specific questions

Question 1

(a)   Most candidates carried out the calculation correctly. Fewer gave their answer to one decimal place as instructed.

(b)   Most candidates constructed a suitable table and entered the data correctly. Some gave correct header titles with units. A common error was to write the units in the data cells rather than just in the table header.

(c)   Most candidates gave one correct conclusion for the data. A common error was to describe the data rather state a conclusion.

(d) (i)   Most candidates gave a correct response. Not all were certain of the difference between volume and concentration.

(ii)   Most candidates gave two correct responses. The most frequently chosen variables were the volume of apple juice, using the same apple juice and the temperature.

(iii) Many found this a challenging question. Common incorrect responses were 'parallax error' and 'shaking the test-tube whilst measuring'. Many thought that using 'a more accurate ruler' would be an improvement.

(e)   Many candidates identified the test-tube **P4** as a control and correctly stated its purpose.

(f)   There were some excellent plans produced for investigating the hypothesis. A large number of candidates knew that DCPIP was a reagent that could be used to test for the presence of vitamin C. Some understood that repeats of an investigation need to be carried out at least twice (i.e. performed three times in total).

(g)   The overall standard of drawings continues to improve, with many candidates producing excellent drawings that met all the assessed criteria. There were few drawings that were too small or too large (i.e. extending into the text). Most of the lines were clear and completely continuous. Usually five compartments were shown, each containing a correctly shaped tissue mass.

(h)   Most candidates gave the correct response. 'Blue' unqualified was insufficient as it could not be distinguished from other food tests.

Question 2

(a)   Most candidates measured the line correctly and stated a unit that matched the measurement they had recorded. A common error was to measure the line **XY** in centimetres but not to also convert the actual size of the petal from millimetres to centimetres so that the incorrect values were used in the formula for magnification. Another common error was to give the magnification value with a unit such as mm.

(b)(i)   Almost all candidates counted the number of petals correctly.

   (ii)   Most candidates calculated the average correctly. The only common error was to give the answer as a decimal rather than as a whole number as instructed in the question.

   (iii)   Most candidates suggested an appropriate method. The most common were to number or mark the petals, or to remove the petals as they were counted to avoid counting the same one twice.

(c)   The majority of candidates plotted the bar chart correctly. The most common error was to draw a histogram rather than a bar chart i.e. no space between the bars on the chart. Some were unable to scale the axes appropriately which either made correct plotting difficult or resulted in a chart that was too small for the size of the grid.

(d)   Many candidates found this question challenging. The best responses showed an understanding that results may be anomalous and that additional counts would increase reliability. A common error was stating that results would be more accurate.

(e)(i)   Most candidates knew the test and described it accurately. The most common omission was that of heating the reactants. It needs to be noted that just using a water-bath is unacceptable, as water-baths can be cold as well as hot. The best responses specified a hot water-bath or a temperature of at least 80°C.

   (ii)   The majority of candidates gave a suitable precaution. Common correct responses included using eye-protection, wearing gloves or handling hot apparatus with tongs.