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A LEVEL

Examiners' report

BIOLOGY B
(ADVANCING BIOLOGY)

H422
For first teaching in 2015

H422/01 Summer 2023 series

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. A selection of candidate answers is also provided. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

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Paper 1 series overview

Paper 1 is worth 110 marks and is split into two sections. Section A is multiple choice and is worth 30 marks and section B comprises short, structured questions involving aspects of problem solving, calculations and questions based on practical.

This examination was felt to be an appropriate level of difficulty although, similar to previous series, a number of candidates gave extended answers containing information not relating to the question.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• interpretated electrocardiogram (ECG) correctly • understood the need for transport systems in multicellular plants • knew the structure of the DNA molecule • identified factors that may increase the risk of developing non-communicable diseases • able to carry out estimate calculations • explained the potential for conflict between agriculture and conservation • knew the role of ruminants in the human food chain • had a good understanding of the control of flowering in plants.	• were not familiar with the structure of stomata, their opening and closing • found it challenging to explain how allergies can result from hypersensitivity of the immune system • didn't know the general principles of homeostasis in the maintenance of a stable internal environment • found it difficult to explain the role of hormones in gametogenesis • found it challenging to evaluate results and draw conclusions about the role of ruminants in the human food chain • were not familiar with the structure and composition of the ruminant digestive system • were not confident with the cardiac cycle • were not familiar with how the incidence and prevalence of a communicable disease can change over time.

Section A overview

This section of the paper consisted of 30 multiple choice questions covering a range of topics across all modules of the Biology B specification. In general candidates seemed to find all of the multiple choice questions accessible and performed well in this section.

As with previous series, there were a number of candidates that left some multiple choice items blank although the number doing this has improved since last series. Candidates should be encouraged to state their preferred option clearly. If an alternative answer is given later in the exam the original answer should be crossed out and the new answer clearly written next to the box. An answer with two letters or is ambiguous was not given any credit.

Question 8

8   Which of the statements about transport systems in plants is correct?

A   Carbon dioxide needs to be transported from leaves to other organs for photosynthesis.

B   Glucose is moved through phloem sieve tubes by translocation.

C   Separate transport systems are needed for mass transport of water and sugars.

D   Water moves through xylem vessels by osmosis.

Your answer [ ]

[1]

There was a variety of answers on this question with no pattern to the incorrect answers. Answer A cannot be true as the leaves are the site of photosynthesis in most plants. Translocation is the movement of sucrose in the phloem not glucose. Water moves by transpiration in the xylem. The correct option was C.

Question 9

9 Which of the statements about the mechanism that results in the opening of stomata is/are correct?

1 The concentration of K^+ ions and sucrose inside guard cells decreases.

2 The water potential of guard cells decreases.

3 Turgidity of guard cells increases.

A 1, 2 and 3 are correct

B Only 1 and 2 are correct

C Only 2 and 3 are correct

D Only 1 is correct

Your answer ☐

[1]

A large number of candidates gave the answer as option A. The most common distractor was statement 1. Most candidates knew that statement 2 was true as very few candidates believed that option D was correct. The candidates had some difficulty linking solute concentration to water potential. As statement 2 was correct it would have required an increase in the concentration of K^+ ions. Option C is correct.

Question 12

12 What bond joins adjacent nucleotides to form a polynucleotide chain?

A Ester

B Hydrogen

C Ionic

D Phosphodiester

Your answer ☐

[1]

Biological molecules and the associated bonds is a topic that continues to improve each year. Many candidates were able to answer the question correctly showing they have a good understanding of the bonds that are formed in such molecules. Option B was the most common incorrect answer which may be as a result of the candidates being unfamiliar with the term adjacent. Option D is the correct answer.

Question 18

18 The graph shows data for *Staphylococcus aureus* infections in a population over a 10-year period.

—○— No. of infections
—■— Percentage of methicillin-resistant infections
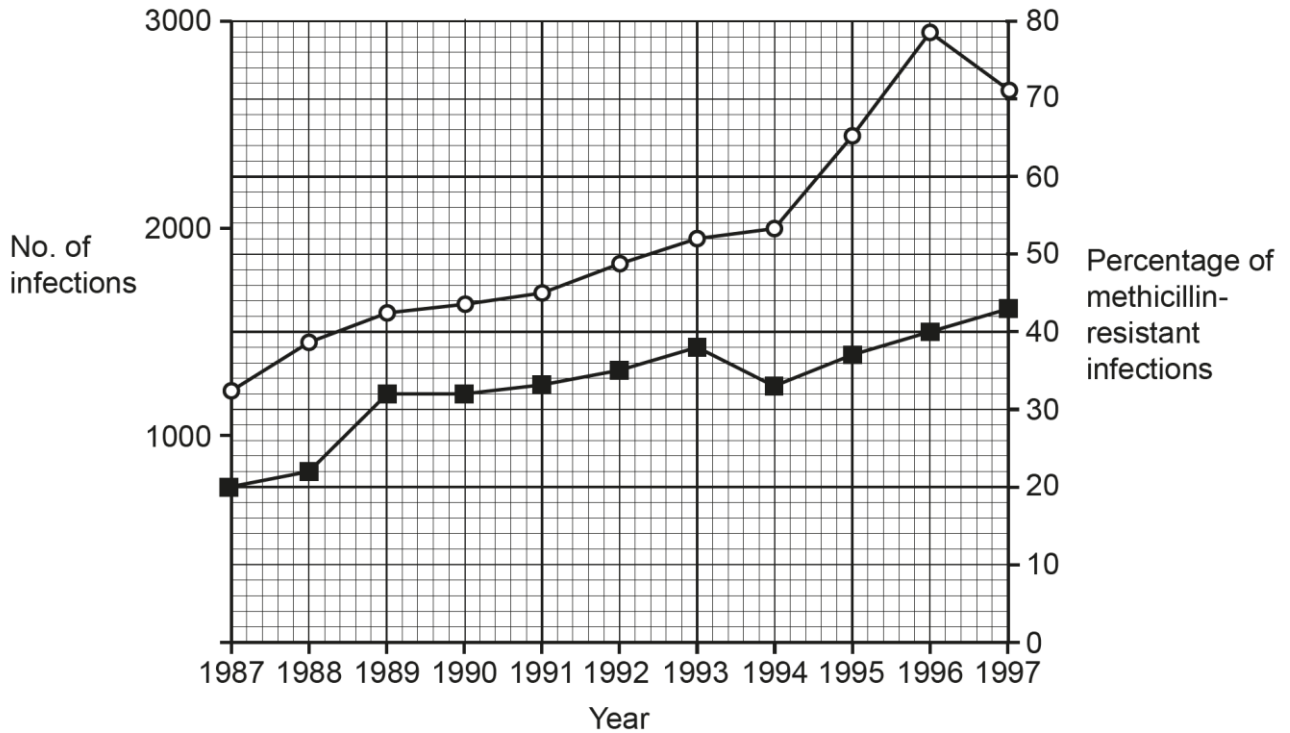
What is the number of methicillin-resistant infections reported in 1996?

A 43

B 79

C 1106

D 1180

Your answer ☐

[1]

Candidates found question 12 as one of the most challenging multiple choice questions. The most common error came from using the incorrect Y-axis and quoting 79 as the correct answer. Many candidates did not realise that the answer required two values to be read from the graph and then a basic calculation. Option D is the correct answer.

Question 20

20 Which of the statements about allergic reactions is correct?

    A   Allergens bind to antigens on mast cells.

    B   Allergens trigger a primary immune response.

    C   Allergic reactions result in long-term immunity.

    D   The allergens that cause allergic reactions are pathogenic.

Your answer   ☐

[1]

> Candidates had difficulties with this question. Immunity is often a topic that some candidates find difficult due to the unfamiliar context and the similarity in terminology. The most common incorrect answer was option A. The correct answer is option B.

Question 24

24 Which option is **not** a feature of a homeostatic control system?

    A   Feedback loop

    B   Negative feedback

    C   Positive feedback

    D   Set point

Your answer   ☐

[1]

> Candidates found this question difficult. Common incorrect answers were often feedback loop and set point. This is likely to be that candidates have been taught the terminology but haven't fully understood the meaning of each term. The correct answer is option C.

Question 30

30 Which mammalian hormone causes the release of testosterone in males and the release of a secondary oocyte in females?

A   Follicle-stimulating hormone

B   Luteinising hormone

C   Oestrogen

D   Progesterone

Your answer ☐

[1]

The question required the recall of knowledge from the male reproductive system. Option A was a good distractor and the most common incorrect answer given by the candidates. A number of candidates incorrectly stated oestrogen as their answer. Very few incorrectly stated progesterone. The correct answer was option B.

Section B overview

This section included questions on a range of topics from across the syllabus. The questions had varying levels of demand and assessed a range of exam skills. This meant that the candidates had the opportunity to gain credit on questions even on difficult parts of the course.

The maths aspects of the paper showed a disparity between the ability of candidates in this area. It was often seen that candidates would get most of the maths marks in the paper or very few of them.

Question 31 (a) (i)

31 Goat farming has an essential role in food production in North Africa.

(a) The table below shows the mean milk yield for two different breeds of goat used for food production in a region of North Africa.

Breed of goat	Mean milk yield per goat during lactation period (kg)	Standard deviation +/–
Draa	141.5	6.0
Laaroussi	52.3	23.2

(i) The population of Draa goats in the region was estimated at 200 000 animals.

The goats produce milk during a lactation period of 120 days. The goats have one lactation period per year.

Estimate the mean milk yield per year for this population.

Give your answer in standard form.

Mean milk yield = ... kg yr^{-1} **[2]**

Many candidates correctly identified 141.5 x 200 000 by accurately identifying the mean yield per goat and the number of animals. A small number of candidates correctly gave the answer in standard form.

OCR support

(i)   Maths for Biology resources, offer a range of support on mathematical skills including standard form.

Question 31 (a) (ii)

(ii)   State a conclusion that can be drawn from the standard deviation values about milk yield in these two breeds.

....

....

.... **[1]**

This was a well answered question with marking point 1 being the most common answer. A number of candidates did not refer to the yield of milk in their answer. Candidates should be encouraged to read the stem of a question and use the terms in the stem to give their answer.

Question 31 (b)

(b)   In recent years, other breeds of domestic goat from Europe have been introduced to North African herds for breeding programmes due to their higher milk yields.

It has been claimed that this practice will improve the outcomes for goat farming in the region.

Discuss the validity of this claim.

....

....

....

....

....

.... **[3]**

Candidates did not consistently gives statements for and against the validity of the claim. Some candidates correctly gave the idea that genes are passed on but referred to the offspring as 'babies'.

Many candidates correctly stated that the European goats may not be suited to the North African climate.

Very few candidates identified the problems with conservation of native breeds.

Question 31 (c) (i)

(c) Laaroussi goats are kept in small herds in the mountainous regions of North Africa where they are important in providing food and income for local people.

The goats graze entirely on forest plants that have a net primary productivity of $350\,g\,m^2\,yr^{-1}$.

A small herd of 20 goats was able to graze $2000\,m^2$ of forest and produced a mean annual increase of 7 kg of biomass per goat.

(i) Calculate the efficiency of biomass transfer between the forest plants and the goats.

Efficiency = ... % **[3]**

More candidates gained credit on this question than Q31ai with many of them gaining the full 3 marks.

Question 31 (c) (ii)

(ii) Explain **two** ways in which the goat farmer could improve the efficiency of biomass transfer to increase meat production of their goats without introducing other breeds.

1 ....

....

2 ....

....

[2]

Candidates showed a thorough understanding of farming practices with many gaining 2 marks and most gaining at least 1 mark. The most common answers were related to limiting the movement of goats and keeping them in barns. Candidates who did not gain credit often did so because they did not explain their answer.

Question 31 (d) (i)

(d) Farm animals such as goats and cows are ruminants.

The alpaca is a type of ruminant native to South America which is farmed to produce wool.

The diagram shows part of the digestive system with stomach chambers (C1–C3) of an alpaca.
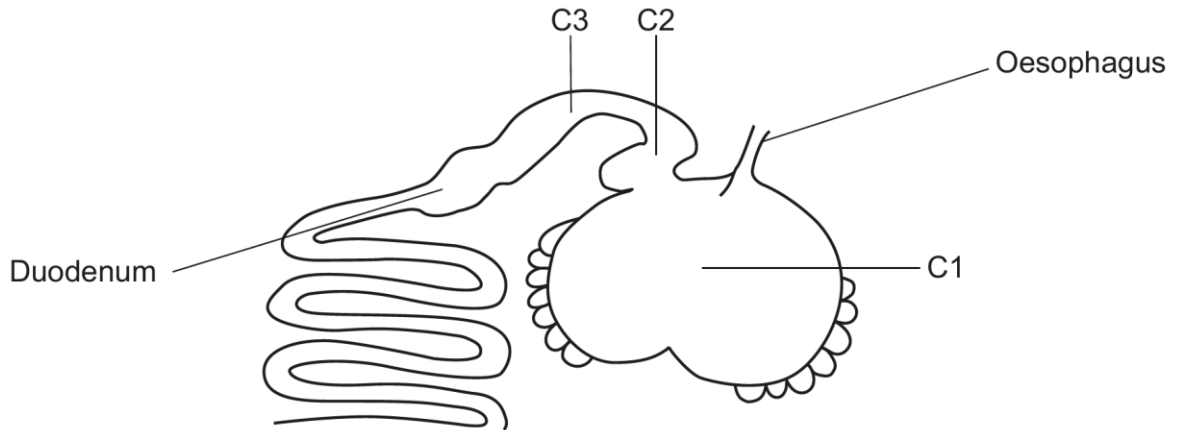
(i) Use the diagram and your knowledge of the ruminant digestive system, to suggest why the alpaca is not considered to be a 'true' ruminant.

....

....

.... **[1]**

This question was very well answered with most candidates correctly stating that ruminants have 4 stomach chambers.

Question 31 (d) (ii)

(ii) Use your knowledge of the ruminant digestive system to explain the importance of stomach chamber C1 in obtaining nutrients.

....

....

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....

....

.... **[3]**

This question was very well answered by a small number of candidates but many candidates gained some credit on this question.

Exemplar 1

Stomach chamber C1 contains many types of bacteria and it has anaerobic conditions as the bacteria respire anaerobically. It's important as the bacteria are able to digest cellulose in plant material by producing the enzyme cellulase and the alpaca wouldn't be able to digest cellulose otherwise. The bacteria break cellulose down into org **[3]** sugars and organic acids that can be absorbed by the small intestine of the alpaca and the bacteria also produce proteins that can be absorbed as well so many nutrients can be obtained from the food the alpaca eats.

Most candidates stated that the rumen contains bacteria but then continued to describe that the ruminant can't digest cellulose without addressing the question. This response gained all the marks as it gave a very clear description that included all 3 marking points.

Question 32 (a) (i)

32 (a) The diagram shows a mammalian heart at different stages of the cardiac cycle.
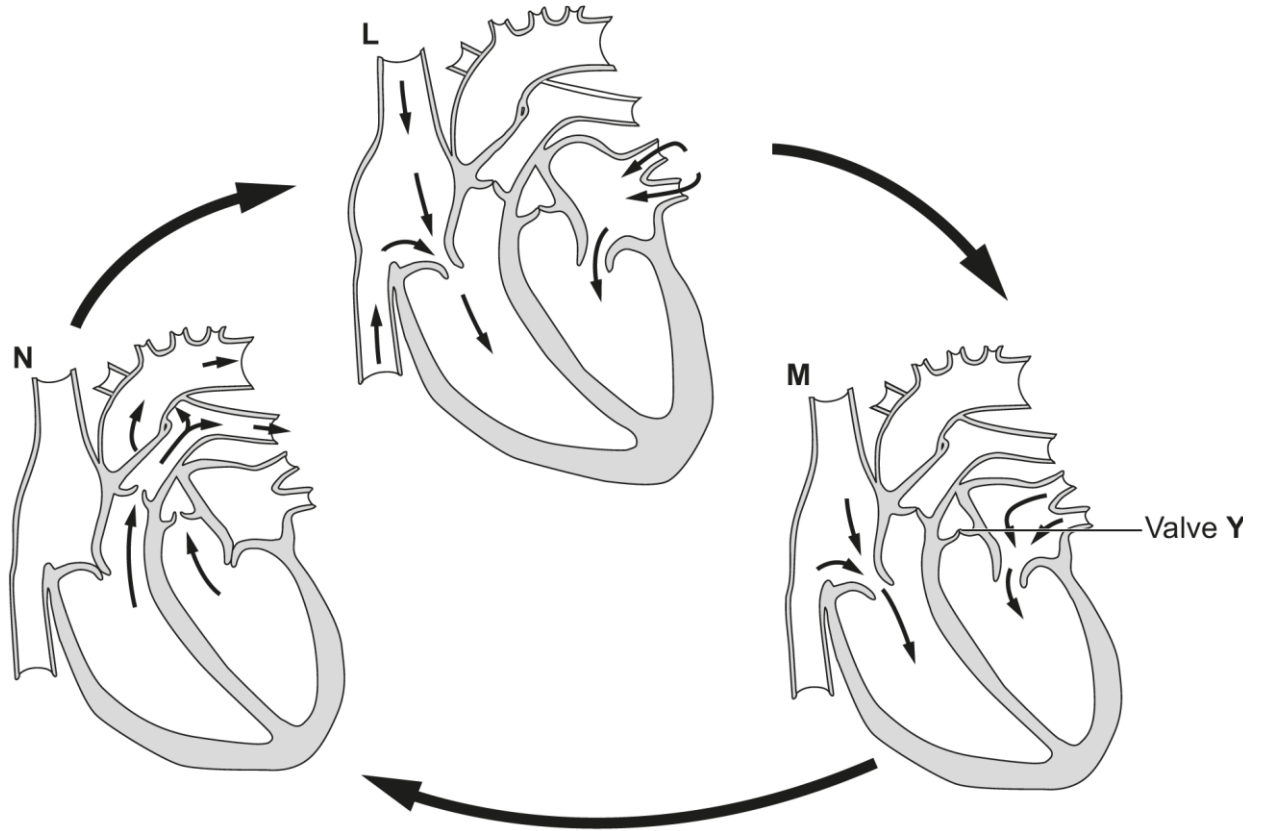
(i) Identify the letter of the stage on the diagram that shows the heart in diastole **and** give a reason for your choice.

Stage ....

Reason ....

....

....

[2]

Many candidates correctly identified image L as the one in diastole. Only a few candidates recognised that the reason is that blood fills the atria before opening the atrio-ventricular valves and filling the ventricles.

Question 32 (a) (ii)

(ii) Describe the role of the valve, labelled **Y**.

....

....

....

.... **[1]**

Candidates could correctly state that valves prevent backflow of blood. A common mistake was that candidates did not state the role of the valve labelled **Y** and as a result did not say that it prevents the back flow of blood into the ventricle.

Question 32 (b)*

(b)* State the location of specialised heart tissues and explain their role in controlling the cardiac cycle.

....

....

....

....

....

.... **[6]**

It was common to see candidates score at either end on the mark range. Low scoring candidates often did not name specialised heart tissues and therefore found it harder to gain credit in their answer. There was a large number of candidates who did not know the names of the valves or referred to the semi-lunar valve as being between the atrium and ventricle.

Exemplar 2

one specialised heart tissue is the sinoatrial node found in the wall of the right atrium. this controls the heartbeat. It spreads an electrical signal across the atrium, causing them to contract and force blood down into the ventricles. To allow time for the ventricles to fill with blood, there is specialised non-conducting tissue under the atria which stops the spread of the electrical impulse further down the heart. Instead, the signal is picked up by the atrioventricular node in the septum of the heart, where it travels down to the Bundle of His at the very bottom of the heart. Purkinje fibres are specialised at carrying this electrical impulse up from the Bundle of His up the sides of the left and [6]

right ventricle, causing the ventricles to contract from the bottom upwards and forcing blood out of the heart and into the aorta and pulmonary artery. other specialised heart tissues include the atrioventricular valves which separate atria and ventricles, which allow the atria to fill in diastole, and the atria kick in atrial systole. They are also forced closed during ventricle systole to prevent blood flowing back into the atria.

This is an example of a response that gained all the available marks and included good explanations of the roles of the tissues involved. The candidate described the specialised tissues in the order that blood flows through the heart. They gave multiple statements about each specialised tissue which show a thorough understanding of the topic.

Question 32 (c) (i)

(c) Researchers were investigating whether the sex of human fetuses had an effect on heart rate.

The researchers obtained heart rate data for 60 fetuses recorded during pre-natal checks.

The fetuses were grouped according to sex and whether their heart rates were <140 bpm (low) or >140 bpm (high).

(i) The table shows the results of their investigation.

	Heart rate	Observed frequency (f_o)	Expected frequency (f_e)	$(f_o - f_e)^2$	$\dfrac{(f_o - f_e)^2}{f_e}$
Male	<140 bpm	24	19.7	18.5	
	>140 bpm	12	17.3	28.1	
Female	<140 bpm	6	12.3	39.7	
	>140 bpm	18	10.7	53.3	
				$\chi^2 =$	

Complete the table **and** calculate the value of χ^2 for these results.

Use the equation: $\chi^2 = \Sigma \dfrac{(f_o - f_e)^2}{f_e}$

Give your answer to **2** decimal places.

Write your answer to **32(c)(i)** in the table. **[3]**

This question was well answered by most candidates. Those that lost marks often did so due to incorrect rounding of their answer.

OCR support

(i) <u>Maths for Biology</u> resources, offer a range of support on mathematical skills including decimal places.

Question 32 (c) (ii)

(ii) The researchers hypothesised that the heart rates of female fetuses were higher than males.

Use your calculated value for χ^2 in **(c)(i)** and the probability table below to conclude whether this hypothesis is supported at 5% significance level.

	χ^2				χ^2				
p%	99	97.5	95	90	10	5.0	2.5	1.0	0.5
v = 1	.0001	.0010	.0039	.0158	2.706	3.841	5.024	6.635	7.879
2	.0201	.0506	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860

....

....

....

....

.... **[2]**

Many candidates correctly identified either 3 degrees of freedom or the critical value of 7.815. A small number of candidates gain both marks. Candidates who did not score on this question often gave the degrees of freedom as 4 or the critical value from the probability column of 0.5.

Question 32 (c) (iii)

(iii) The researchers used probability calculations to determine the expected values for each group.

Suggest why the researchers could not assume an expected value of 15 for each group.

....

....

.... **[1]**

This question was not well answered. Very few candidates gained credit. Candidates needed to recognise that predicting the heart rate of a fetus is very difficult/impossible


Question 32 (iv)

(iv) Suggest **one** modification to the investigation that could improve the validity of their results.

....

....

.... **[1]**

Although some candidates did not gain credit, those that did referred correctly to the same age of foetuses. The other expected answers were seen less frequently.

Question 33 (a) (i)*

33 **(a)** Daylength is an environmental factor that affects flowering in plants.

Hyoscyamus niger and *Euphorbia pulcherrima* are species of plant that show different flowering patterns when exposed to periods of light and dark over a 24-hour period.

The plants were exposed to three different variations of light and dark periods:

1   10 hours of darkness followed by 14 hours of light.

2   14 hours of darkness followed by 10 hours of light.

3   6 hours of darkness then a flash of light followed by a further 8 hours of darkness and then 10 hours of light.

Fig. 33.1 shows these variations of light and dark periods to which the plants were exposed to over a 24-hour period during an investigation.

Fig. 33.1

(i)*   It was concluded that *H. niger* is a short-day plant and *E. pulcherrima* is a long-day plant.

Compare the flowering patterns of these two species when exposed to each of the different periods of light and dark shown in **Fig. 33.1**.

....

....

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....

....

.... **[6]**

This was a challenging level of response question. A number of candidates showed a very good understanding of the control of flowering. Some candidates made correct references to two light dark variations for both species but also gave an incorrect statement. In correct statements tended to occur when the candidate compared variation 3. A small number of candidates gained no credit as they incorrectly compared both species in all 3 light dark variations.

Exemplar 3

long night

27
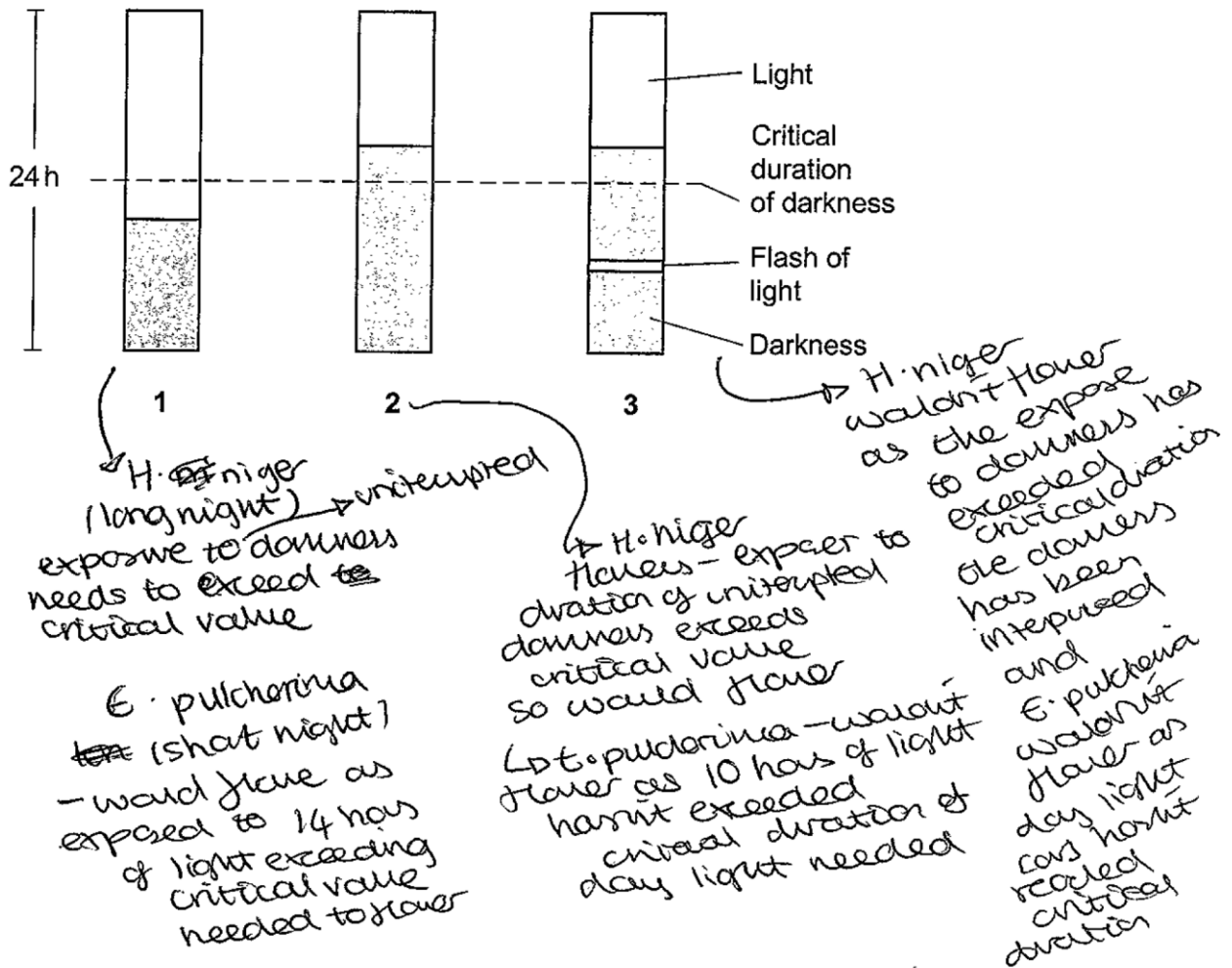
short night

It was concluded that *H. niger* is a short-day plant and *E. pulcherrima* is a long-day plant.

Compare the flowering patterns of these two species when exposed to each of the different periods of light and dark shown in **Fig. 33.1.**

when both plants are exposed to number 1, ~~the would~~ H. niger wouldn't flower as it is a short day plant and the expose to uninterupted darkness (10 hrs) has not exceeded the critical duration so wouldn't flower where as E. pulcherrima would flower as it is a long day plant and the 14 hours of light has exceeded critical duration ⌐of light⌐ needed for plant to flower. In number 2 H. niger would flower as the 14 hous of darkness (uninterupted) exceeds the critical duration of darkness needed for the plant to flower. on the other hand E. pulcherrima wouldn't flower as the 10 hours of light hasn't reached the critical duration for the plant to flower. Then in number 3, H. niger **[6]**

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wouldn't flower as eventually the exposure
to darkness has exceeded the critical duration
needed for the plant to flower, the exposure
to darkness was interrupted with a flash of
light inbetween 6 hours of darkness and 8 and short
day plant need to be exposed to uniterrupted
exposure to darkness to flower, to pulcherrima
also wouldnt flower as the 10 hours of light
hasn't exceeded the critical duration of
light needed for the plant to flower

A good response to this challenging LoR question, showing a very good understanding of the control of flowering in day and night plants. This response gave good descriptions of both plant species in all 3 light variations. The Level 3 award only required 2 light variations to be discussed so this response shows a very good understanding of the topic. The question could have been improved by using the terms set out in the question. Here the response describes variations are numbers.

Question 33 (a) (ii)

(ii) Explain how flowering plants monitor periods of light and dark.

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....

....

....

....

.... **[3]**

Some candidates showed a good understanding of Pfr and Pr conversions. Some candidates did not refer to photoreceptors or phytochromes in their answer thus preventing them access to all the marks available. A small number of candidates mixed up the conversion of Pfr/Pr in different colours of light and as a result scored low on this question.

OCR support

(i)   The most common mistake was that candidates confused Pfr and Pr conversions in different conditions. Support on this topic is available on Teach Cambridge

Question 33 (a) (iii)

(iii) Some plants are known as day-neutral because flowering is not affected by daylength.

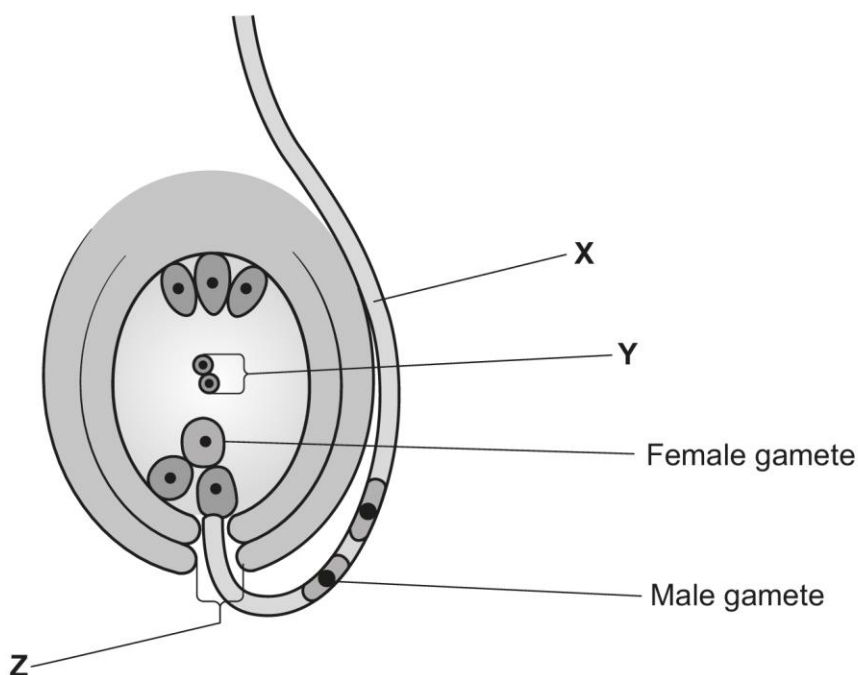Suggest **one** environmental factor that could trigger flowering in day-neutral plants.

.... **[1]**

This question was well answered with most candidates stating 'temperature' as the environmental factor.

Question 33 (b) (i)

(b) **Fig. 33.2** shows the process of fertilisation in a flowering plant.

Fig. 33.2

(i) Identify the structures labelled **X** and **Z**.

Structure **X** ....

Structure **Z** ....

[2]

Some candidates recognised both structures correctly. Many were less aware of micropyle. Labels that are common in the human reproductive system such as ovary and uterus were seen.

Assessment for learning

It can better to allow the candidates to dissect a flowering plant in order to see the reproductive parts of the flower but also the vascular tissue in the stem. This can be used to help meet the CPAC for practical endorsement in PAG1 and PAG2.

Science & plants for schools has a range of resources to support with teaching plants topics as well as alternative practical activities to support your teaching. The flower dissection resource includes teacher/technician, student notes and a step by step video as well as a support sheet and worksheet for completing the dissection.

Question 33 (b) (ii)

(ii) Describe what happens to structure **Y** during **and** after fertilisation.

During fertilisation ....

....

After fertilisation ....

....

[2]

Candidates who scored well on Question 33 (b) (i) often score well on this question. Endosperm was most commonly given credit although some excellent descriptions of during fertilisation was seen in many answers.

Question 33 (b) (iii)

(iii) Explain how the production of the male and female gametes in **Fig. 33.2** ensures they are genetically different to the parent plants.

....

....

....

....

....

.... **[3]**

This question was very well answered with many candidates scored 2 out of 3 marks. The most common answers included crossing-over and independent assortment. A common incorrect answer was that crossing-over creates new alleles.

Question 34 (b) (i)

(b)   In many countries TB is a notifiable disease and the number of cases in the population are recorded each year.

The graph shows the number of cases of TB recorded in the United States of America (USA) between 1982 and 2016.
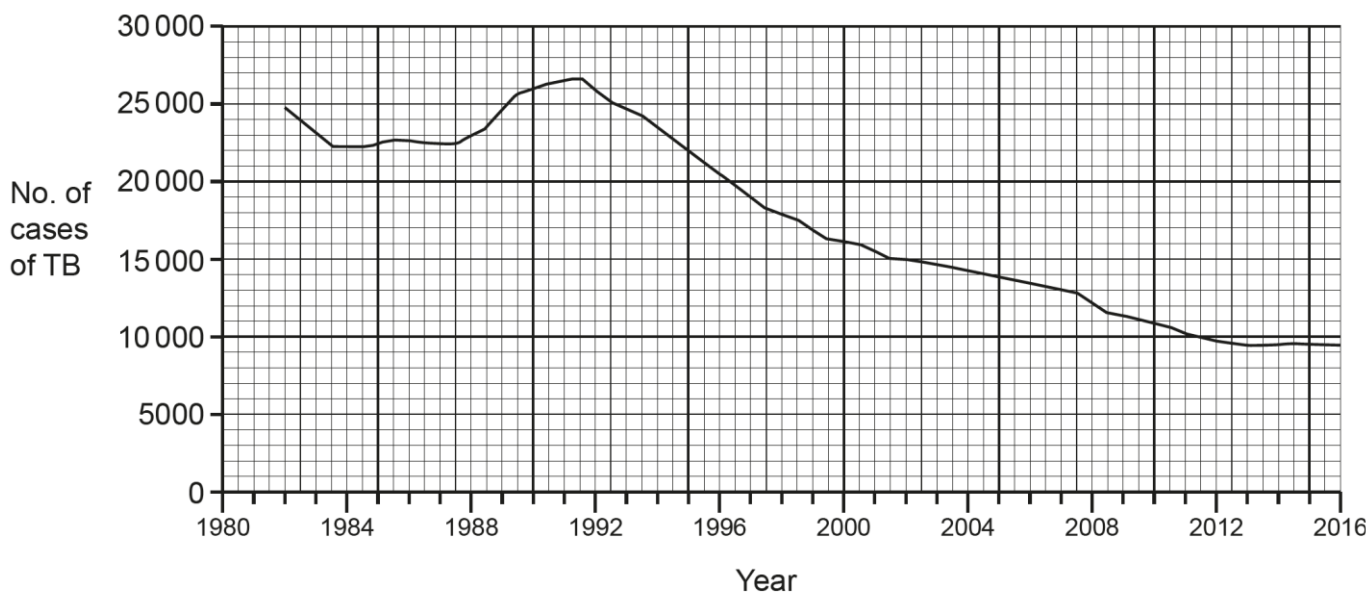
(i)   Suggest **one** advantage of recording data on notifiable diseases such as TB.

....

.... **[1]**

Candidates gave the range of potential answers available. The most common answer focused on identifying trends. A common incorrect answer was that it can prevent outbreaks occurring.

Question 34 (b) (ii)

(ii)   In 2015 the population of the USA was estimated at 320 million people.

Calculate the prevalence rate of TB in the USA in 2015.

Give your answer to **3** significant figures.

Rate = ... per 100 000 **[2]**

Many candidates obtained full marks for '2.97'. Candidates without the correct value often struggled to demonstrate the appropriate calculation. Very few candidates gave the correct answer to the wrong significant figures showing that the majority have a good understanding of correctly rounding numbers.

Question 34 (b) (iii)

(iii)   The overall trend in the data shows a decrease in the prevalence rate of TB.

Suggest why there was an increase in prevalence rate that occurred between 1985 and 1991.

....

....

.... **[1]**

A number of candidates were challenged by this question. Common incorrect answers re-stated that there was a rise in the prevalence rate without suggesting a reason why. Correct answers did refer to migrants from areas where the disease is endemic or they made a link with it being opportunistic and resulting in the disease AIDS.

Question 34 (c) (i)

(c) The table shows some of the data recorded for TB in the USA in 2016.

Age group (years)	Sex	Number of cases per 100 000
0–5	male	1.3
	female	1.0
5–14	male	0.3
	female	0.4
15–24	male	2.5
	female	1.9
25–44	male	3.8
	female	2.8
45–64	male	4.6
	female	2.1
65 and over	male	6.5
	female	3.2

(i) Plot the results from the table on the grid.
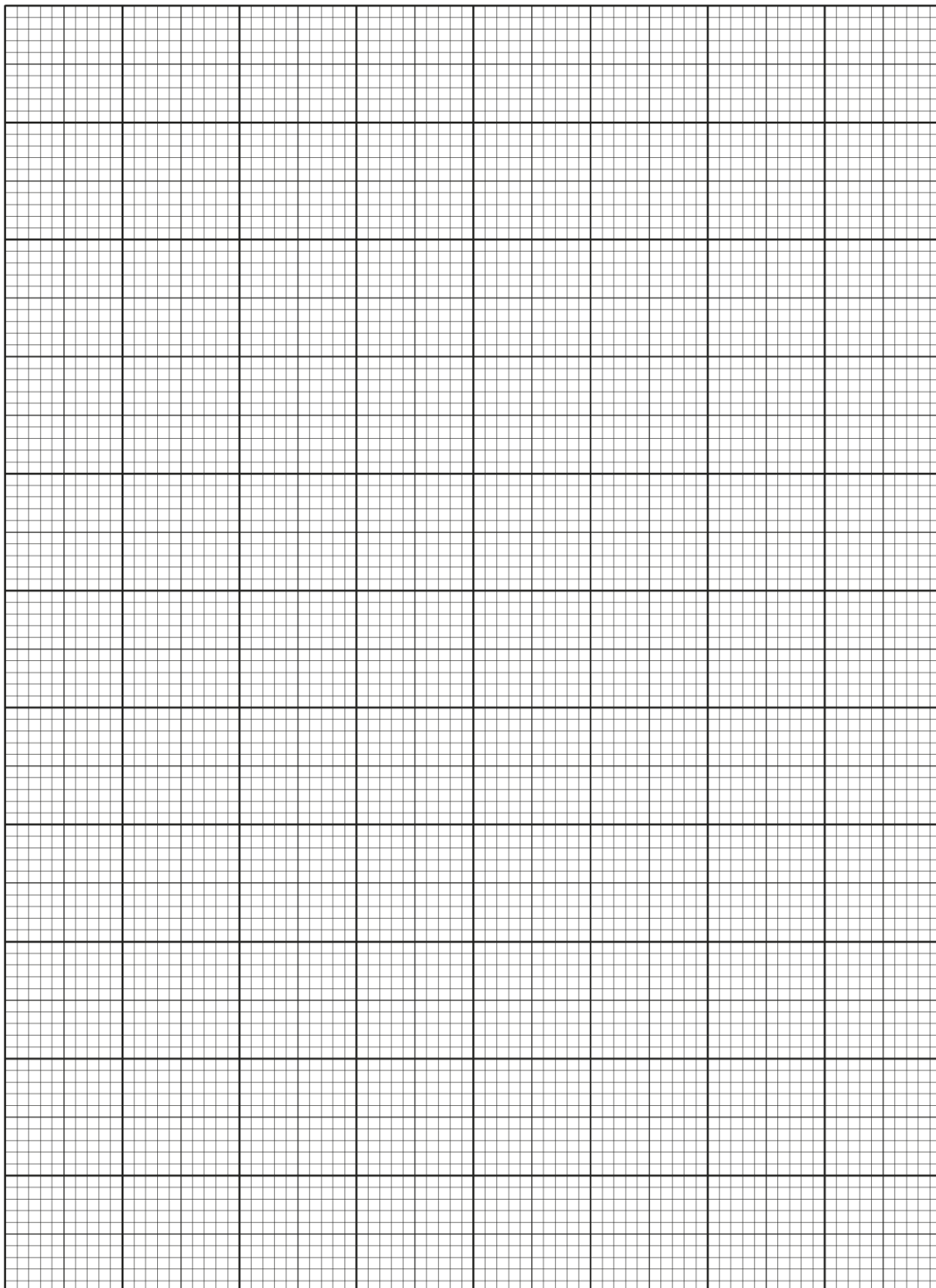
[3]

This question allowed many candidates to show good graphical skills and plotting of data.

Only a small number of candidates correctly produced a bar chart. A large number of candidates either drew a line graph of the results or drew all the bars touching each other. Plotting of the values was done correctly by the majority of candidates.

Question 34 (c) (ii)

(ii) The following conclusions were drawn from these data:

• The risk of TB increases with age.

• Males have a greater risk of contracting TB than females.

Evaluate these conclusions.

....

....

....

....

....

.... **[4]**

This question was challenging for most candidates. There was a tendency to make some descriptive points but clear evaluative points were not often given. Many candidates gave arguments against which included correctly referring to the data between 5-14 years old, the requirement of statistical analysis and the correct use of comparative figures.

Question 35 (a)

35 In the UK, pregnant women receive dietary advice as part of an antenatal care programme.

(a) The table shows the roles of some of the nutrients required by pregnant women as part of a balanced diet.

Complete the table by stating the name of a nutrient that matches the role.

Role in the growing fetus	Nutrient
DNA synthesis, production of erythrocytes and cell division	....
Synthesis of haemoglobin	....
Synthesis of the pigment, rhodopsin	....

[3]

This question was well answered by the candidates. The most common mistake by the candidates was not knowing that folic acid is the nutrient required for DNA synthesis

Question 35 (b)

(b) In addition to dietary advice, pregnant women are offered tests to monitor their health and the health of the fetus.

The tests offered includes testing urine for the presence of glucose which could indicate gestational diabetes.

State **one** other test offered to pregnant women and give a reason why it is offered.

Test ....

....

Reason ....

....

[2]

Many candidates correctly stated one of the tests and the reason for using the test. Incorrect answers often included the use of amniocentesis or chorionic villus sampling. These answers could not be given credit as the question asked what tests are offered to the mother to monitor her health, and the health of the fetus.

Question 35 (c) (i)

(c) Gestational diabetes is a type of diabetes that only occurs in pregnancy.

In women with gestational diabetes, the homeostatic control of glucose concentration in the blood does not function correctly during their pregnancy.

The diagram below shows part of the negative feedback mechanism for the homeostatic control of glucose.
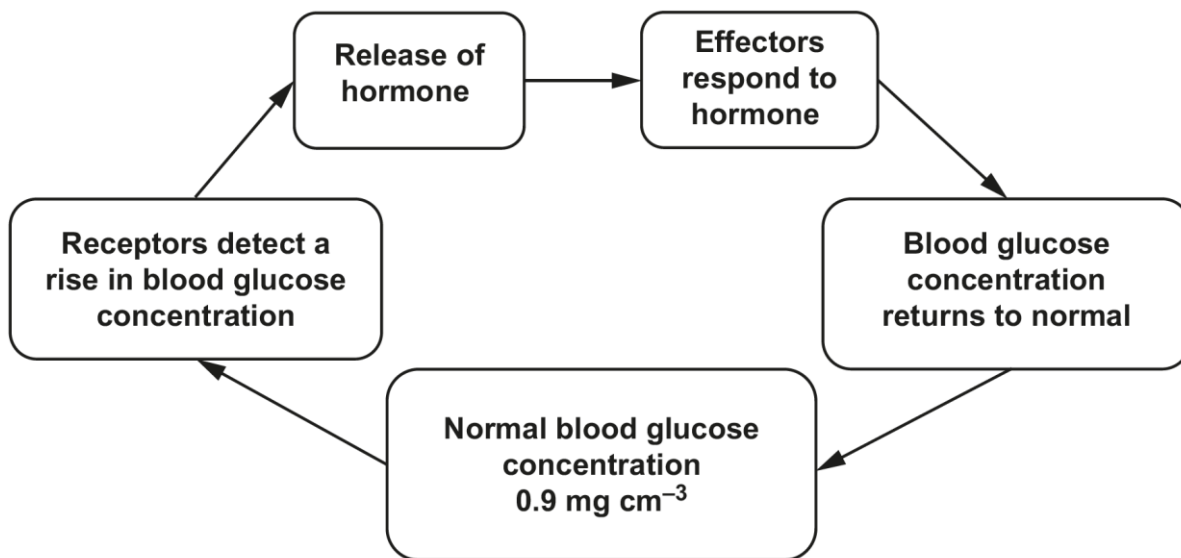
(i) State the name of the receptors that detect a rise in blood glucose concentration **and** their location in the body.

Name ....

Location in the body ....

[1]

Many candidates correctly recalled that beta cells are found in the Islets of Langerhans/pancreas. A number of candidates incorrectly included alpha cells. A small number of candidates stated that beta cells are found in the kidneys.

Question 35 (c) (ii)

(ii) Explain how the effectors respond to the hormone to return blood glucose concentration to normal.

....

....

....

....

.... **[2]**

This question was generally answered well. Some candidates provided very detailed explanations of the events related to the increased uptake of glucose at the cell surface membrane of effector cells and included all 3 marking points in their answer.

Question 35 (c) (iii)

(iii) Gestational diabetes is similar to type 2 diabetes.

Explain why blood glucose concentration is **not** controlled in women with gestational diabetes.

....

....

....

....

.... **[2]**

Many candidates recalled that the effectors did not respond to insulin. Less able candidates referred to insulin resistance in their answer. A common mistake that candidates made was to explain gestational diabetes in terms of less insulin being produced by beta cells similar to type 1 diabetes.

Misconception
?   The most common misconception was all types of diabetes are caused by beta cells under producing insulin. It is true that a characteristic of type 1 diabetes is a lack of insulin production but type 2 is characterised by the effector cells becoming less responsive over time.
Support on this topic is available on Teach Cambridge

Question 35 (d) (i)

(d) Women with gestational diabetes during pregnancy have an increased risk of developing type 2 diabetes in later life.

    (i) Suggest why these women have an increased risk of developing type 2 diabetes.

....

....

....

....

.... **[2]**

Some candidates correctly referred to the gain in weight as a risk factors in developing type 2 diabetes with less candidates making a link to an increased blood pressure. The explanation of insulin persistence after pregnancy was often less clear and only a small number of candidates accessed this mark.

Question 35 (d) (ii)

    (ii) Suggest **one** way that women with gestational diabetes could reduce the risk of developing type 2 diabetes in later life.

....

....

.... **[1]**

This question was answered well by most candidates. The control of diet and/or increased exercise was correctly included.

Question 36 (a) (i)

36 A group of students were using a haemocytometer to count the number of algal cells in a population.

Each student used the same method to prepare their cell samples for viewing under a microscope.

The drawing shows the field of view seen by one of the students.
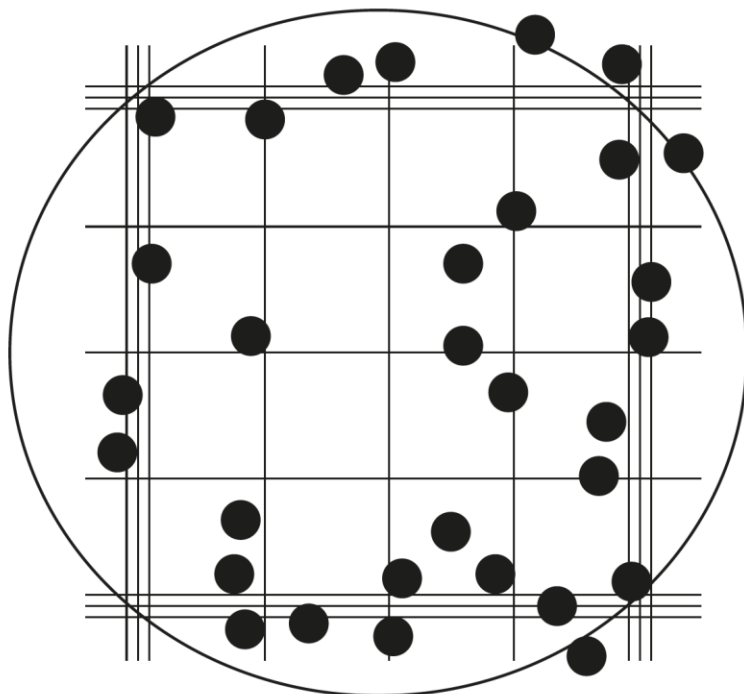
(a) The student counted all the cells in their field of view.

The other students stated that this method of counting cells was not correct and would affect their class results.

(i) Outline a correct method for counting cells using a haemocytometer.

....

....

....

....

.... **[2]**

The North-West rule was generally explained well by candidates. Candidates who did not gain 2 marks often correctly stated that the cells touching the top and left lines should be counted but did not include a reference to counting cells within the grid.

Question 36 (a) (ii)

(ii) Explain how the class results would be affected by including the results obtained by the student who counted all the cells in their field of view.

....

....

....

....

.... **[2]**

Many candidates correctly considered the increase to the mean value but the explanation of the high count for the candidate or the candidates results being anomalous was less well-explained.

Question 36 (b)

(b) Other methods can be used to count cells.

Complete the sentences about a method to count cells using the most appropriate word(s).

.... is an electronic method of counting cells that uses laser

beams. The cells can be tagged to make them .... when they pass

through the laser beam. The specific scattering of light as each cell passes through the

beam allows them to be counted and also for their .... and physical

characteristics to be analysed.

[3]

Most candidates correctly stated flow cytometry as the electronic method of counting cells and also knew that the cells are tagged to make them fluoresce. The most common error was that candidates did not refer to 'chemical' characteristics.

Erratum notice

Instructions to invigilators:

Before the start of the exam, give one copy of this erratum to each candidate.

Ask all candidates to change their copy of the question paper before starting the exam.

Instructions to candidates:

Turn to **page 19** of the **question paper** and look at **question 31(c)**.

In the second sentence, cross out the unit '$g\,m^2\,yr^{-1}$' and replace with the unit '$g\,m^{-2}\,yr^{-1}$'.

The sentence should now read:

The goats graze entirely on forest plants that have a net primary productivity of 350 $g\,m^{-2}\,yr^{-1}$.

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