

Examiners' Report

June 2025

Int GCSE Single Science 4SS0 1B

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Introduction

There is a wide range of candidates taking this paper and this is reflected in the range of scores for the paper and for the longer items.

The examiners were pleased that most candidates attempted to answer all questions and there was no evidence of candidates running out of time on this paper. Candidates and centres are working hard to prepare for this examination, and most were able to access all question types. Candidates were able to demonstrate their knowledge and understanding of the specification content and the best candidates were able to apply this in familiar and novel contexts. Examiners were also pleased to note that candidates were able to produce answers to the more challenging evaluative and experimental design items.

Candidates were able to perform calculations and plot line graphs to represent data and then use their graphs to make appropriate conclusions. Most candidates were able to gain credit from the experimental design item.

Question 1(a)(i)

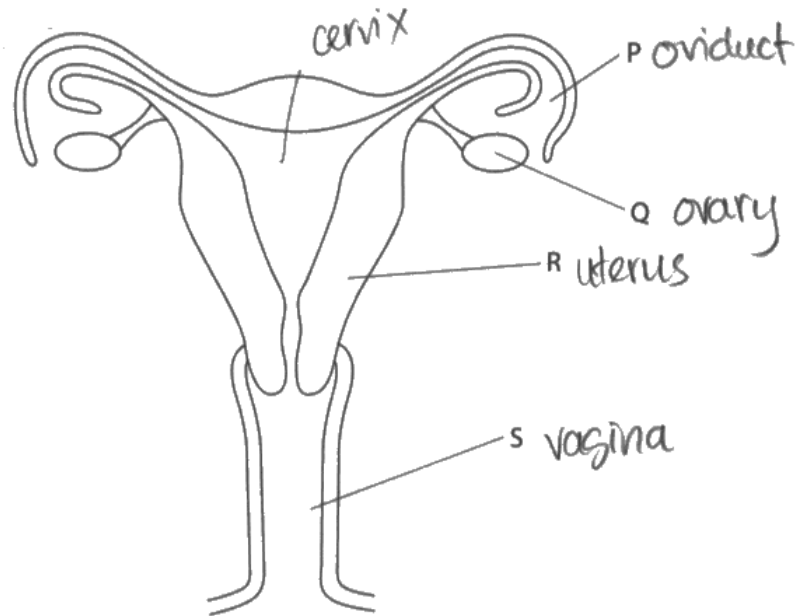
The first question of the paper gave candidates a diagram showing the human female reproductive system with some structures labelled. In Q01(a)(i) candidates were asked to label three structures; the oviduct, the ovary and the uterus.

Many candidates gained full marks but some confused the uterus with the vagina.

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 (a) The diagram shows the human female reproductive system with some structures labelled.



- (i) Give the names of these structures.

(3)

P Oviduct
Q ovary
R uterus

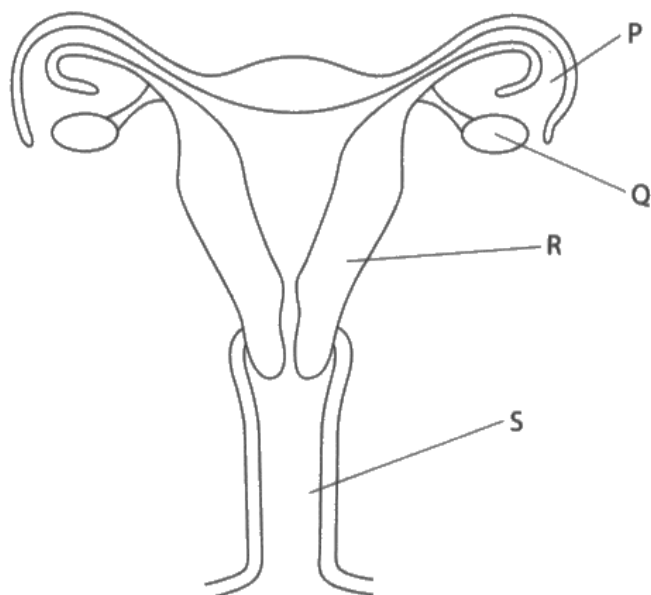


This response correctly identifies the three structures as oviduct, ovary and uterus and gains three marks.

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 (a) The diagram shows the human female reproductive system with some structures labelled.



- (i) Give the names of these structures.

(3)

P Oviduct
Q Ovary
R Ovary Ovary

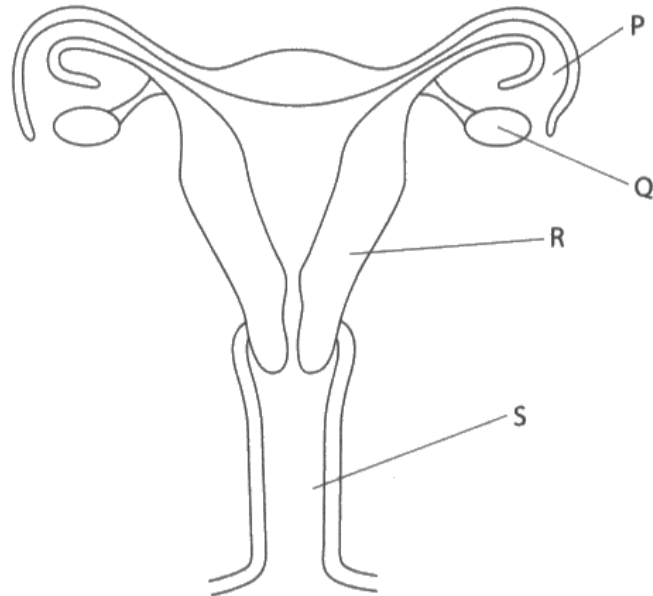


This response correctly gives the names of the structures P and Q. It scores two marks.

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 (a) The diagram shows the human female reproductive system with some structures labelled.



- (i) Give the names of these structures.

(3)

P

Q Ovary

R



This response scores one mark for naming Q as the ovary.

Question 1(a)(ii)

In Q01(a)(ii) candidates were asked to describe the role of structure S in reproduction. Many responses gained credit for writing that this is where sperm are released during copulation and that it allows the baby to pass out during birth.

(ii) Describe the role of structure S in reproduction.

(2)

~~The role of the vagina~~ The vagina is a muscular tube that connects the cervix to the outside of the body. The role of the vagina is to contract and push the baby out of the body. This is also where the penis enters during sexual reproduction.



This response gains both marks for description of the role of the vagina in birth and in copulation.

(ii) Describe the role of structure S in reproduction.

(2)

Penis is inserted into the vagina during sexual reproduction in humans.



This response gains one mark for role of vagina in copulation.

(ii) Describe the role of structure S in reproduction.

(2)

the role of S in reproduction is to help the sperm go into the female reproduction system to fertilise the egg.



This response also gains one mark for role of vagina in receiving sperm.

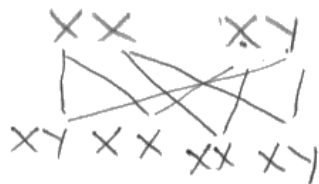
Question 1(b)

Q01(b) asked candidates to draw a genetic diagram to show which parent determines the sex of an offspring at fertilisation. Many responses gained full marks for using a Punnett square to show the genotypes of the parents, the gametes formed and the genotypes and ratio of the offspring.

- (b) The sex chromosomes inherited from the parents determine the sex of an offspring at fertilisation.

Draw a genetic diagram to show which parent determines the sex of an offspring at fertilisation.

(3)



⇒ XY parent (male) determines sex of an offspring

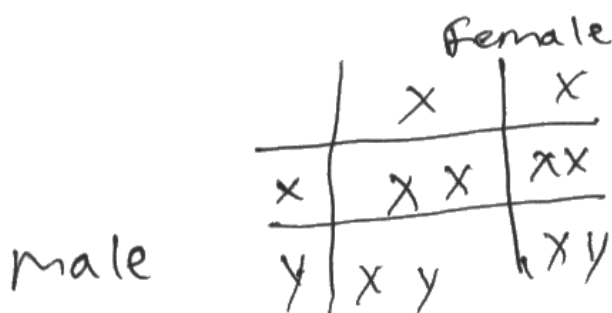


This response scores all three marks for showing the parents, the offspring and indicating that the male determines the sex at fertilisation.

- (b) The sex chromosomes inherited from the parents determine the sex of an offspring at fertilisation.

Draw a genetic diagram to show which parent determines the sex of an offspring at fertilisation.

(3)



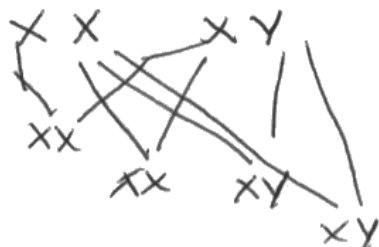
This response also gains three marks for showing the parents, the gametes formed and the

offspring.

- (b) The sex chromosomes inherited from the parents determine the sex of an offspring at fertilisation.

Draw a genetic diagram to show which parent determines the sex of an offspring at fertilisation.

(3)



50% Female
50% male



This response scores two marks for the parents and offspring.



The candidate needs to show separation of the gametes or indicate that the male determines the sex to gain full marks.

- (b) The sex chromosomes inherited from the parents determine the sex of an offspring at fertilisation.

Draw a genetic diagram to show which parent determines the sex of an offspring at fertilisation.

(3)

	x	y
X	X X	X Y
X	x x	x Y

well



This response also gains full marks from a correct Punnett square that shows the parents, the gametes and the offspring.

Question 1(c)(i)

In Q01(c)(i) candidates were asked to calculate the percentage difference in the number of male births per 100 female births in 2020 compared with 1910. This required using the graph to extract the information for the calculation. Many responses scored full marks.

- (i) Calculate the percentage difference in the number of male births per 100 female births in 2020 compared with 1910.

(2)

103.9

105.1

$$105.1 - 103.9 = 1.2$$

$$\begin{array}{r} 86.583 \\ 1.2 \overline{)103.9} \end{array}$$

percentage difference = 1.2 %



This response gains full marks for the correct answer to one decimal place.

- (i) Calculate the percentage difference in the number of male births per 100 female births in 2020 compared with 1910.

(2)

Per 100 people, 103.9 babies and 105.1 babies will be born in respective of 1910 and 2020. We have:

$$\frac{105.1 - 103.9}{103.9} = 1.15\%$$

percentage difference = 1.15 %



This response also scores full marks for the correct answer to two decimal places.

- (i) Calculate the percentage difference in the number of male births per 100 female births in 2020 compared with 1910.

(2)

$$\frac{105.1}{100} - \frac{103.9}{100} = 0.012$$

percentage difference = 0.012 %



This answer is not correct but the response scores one mark for correctly reading the two values from the graph.



Candidates should always show the working, so as in this case, even if the final answer is incorrect they can still gain some credit.

Question 1(c)(ii)

In Q01(c)(ii) candidates were required to use the graph to determine the difference between the highest number and the lowest number of male births per 100 female births. Again many responses scored full marks.

- (ii) Use the graph to determine the difference between the highest number and the lowest number of male births per 100 female births.

(2)

$$106.7 - 103.55 = 3.15$$

difference = 3.15



This response scores both marks for correctly reading the values from the graph and subtracting to get the correct range.

- (ii) Use the graph to determine the difference between the highest number and the lowest number of male births per 100 female births.

(2)

$$\begin{array}{r} 106.7 \\ 103.5 \\ \hline 003.2 \end{array}$$

difference = 3.2



This response also scores both marks for correctly reading the values from the graph and subtracting to get the correct range.

- (ii) Use the graph to determine the difference between the highest number and the lowest number of male births per 100 female births.

(2)

$$\begin{aligned} H &= 106.7 \\ L &= 103.1 \end{aligned}$$

$$\text{difference} = 3.6$$



This response does not get the correct range but scores one mark for subtracting their values.



As before always show your working stages.

Question 1(c)(iii)

In Q01(c)(iii) candidates were asked to suggest a reason why the number of male births per 100 female births varies. Some responses gained credit for suggesting that fertilisation is a random process so ratios may vary.

(iii) Suggest a reason why the number of male births per 100 female births varies.

(1)

In sexual reproduction fertilization is random, the number varies because there is no guarantee number of male and female fertilization.



This response scores the mark for writing that fertilisation is random.

(iii) Suggest a reason why the number of male births per 100 female births varies.

(1)

Because the sex of offspring is totally random.



This response also scores one mark.

Question 2(a)(ii)

In question 2 candidates were given a diagram showing part of a food web. In Q02(a)(ii) they had to give a food chain from this food web that has four trophic levels. Most responses scored both marks for the correct chain with arrows in the correct direction showing the flow of energy.

(ii) Give a food chain from this food web that has four trophic levels.

(2)

Grass → mouse → snake → eagle



This response scores both marks for the correct food chain with correct arrows.

(ii) Give a food chain from this food web that has four trophic levels.

(2)

grass → mouse → snake → eagle



This response also scores both marks for the correct food chain with correct arrows.

(ii) Give a food chain from this food web that has four trophic levels.

(2)

grass, mouse, ~~snake~~ snake, eagle



This response scores one mark for correct order of organisms but no mark for correct arrows.

Question 2(a)(iii)

In item Q02(a)(iii) many responses could correctly name the trophic level that the rabbit belongs to.

(iii) Name the trophic level that the rabbit belongs to.

~~Secondary consumer~~ Primary consumer (1)



Primary consumer gains the mark.

(iii) Name the trophic level that the rabbit belongs to.

(1)

Trophic level 2, primary consumers
Primary consumers



Trophic level two also gains the mark.

(iii) Name the trophic level that the rabbit belongs to.

(1)

one trophic level



No credit for one trophic level.

Question 2(b)

In Q02(b) candidates were given data about energy transfers in a woodland.

They were given the energy in one year that is available, lost in respiration and stored in biomass for producer, primary consumer, secondary consumer and tertiary consumer.

Candidates were asked to comment on the differences in energy transfers shown in the table. The best responses commented on the reduction in energy available along food chain and then compared the percentage energy available and used at each level. Weaker responses quoted data without comparison or comment.

(b) Scientists investigate the energy transfers in a woodland.

They find that 2 000 000 kJ of energy from light is available to 1 m² of woodland in one year.

For each trophic level, the scientists measure the energy in one year that is

- available
- lost in respiration
- stored in biomass

The table shows their results for 1 m² of woodland in one year.

Trophic level	Energy transfers in kJ (percentage of energy available)		
	energy available	energy lost in respiration	energy stored in biomass
producer	2 000 000	22 460 (1%)	90 000 (5%)
primary consumer	90 000	4 600 (5%)	9 400 (10%)
secondary consumer	9 400	240 (3%)	1 320 (14%)
tertiary consumer	1 320	36 (3%)	184 (14%)

Comment on the differences in energy transfers shown in the table.

In your answer refer to transfers

- **within** each trophic level
- **between** the trophic levels

(5)

- Producers have the highest ^{/most} energy available and only a small amount is lost in respiration because it also undergoes photosynthesis, in fact, it's the least energy loss ^{→ in respiration} of all trophic levels (1%). Also ^{has} the least energy stored in biomass (only 5%).
- Primary consumers have the most energy loss in respiration but moderate ~~loss~~ in energy stored in biomass and energy available.
- Secondary and ~~primary~~ ^{tertiary} consumers have similar energy content in what is lost in respiration ^(3%) and what is stored in biomass (14%).
 - ↳ The most loss of energy is between the producer and primary consumer in everything (energy available, energy lost, energy stored)
191,000 4% 5%
 - ↳ From primary to secondary the energy difference is moderate
80,600 (energy available (lost)), 2% energy lost in respiration, 4% lost in biomass.
 - ↳ 8080 energy lost a similar percentage overall for energy lost in respiration and lost in biomass for between secondary and tertiary consumers.



This response scores full marks for including: producer has most energy available (mp1). Producer has least % energy lost in respiration (mp4). Producer has less % energy stored in biomass (mp2). Primary consumer has most % energy lost in respiration (mp6). Secondary and tertiary consumers have same % energy stored in biomass (mp9).

(b) Scientists investigate the energy transfers in a woodland.

They find that 2 000 000 kJ of energy from light is available to 1 m² of woodland in one year.

For each trophic level, the scientists measure the energy in one year that is

- available
- lost in respiration
- stored in biomass

The table shows their results for 1 m² of woodland in one year.

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tertiary consumer	1 320	36 (3%)	184 (14%)

Comment on the differences in energy transfers shown in the table.

In your answer refer to transfers

- **within** each trophic level
- **between** the trophic levels

(5)

* the producer is the highest because it feeds the other trophic level
* the producer energy lost in respiration and energy stored in biomass is the least because the number energy available is the highest because of photosynthesis
* primary consumer 5% of energy is lost because it most probably is an animal cell and energy stored is higher because in animal cell they store energy
* secondary and tertiary's percentages that is lost is the same but secondary consumer energy that available is higher than tertiary



This response scores four marks for: producer has most energy (mp1), producer least energy lost (mp4), producer least energy stored (mp2), and secondary and tertiary consumers have the same energy stored (mp6).

Question 3(a)

In Q03(a) candidates were asked to give the balanced chemical symbol equation for photosynthesis. Despite this being on the specification only the best responses gained full marks. No credit was given for incorrect formulae or word equations.

3 Photosynthesis in green plants uses light energy to produce carbohydrates.

(a) Give the balanced chemical symbol equation for photosynthesis.

(2)



This answer gains both marks for correct formulae and correctly balanced.

3 Photosynthesis in green plants uses light energy to produce carbohydrates.

(a) Give the balanced chemical symbol equation for photosynthesis.

(2)

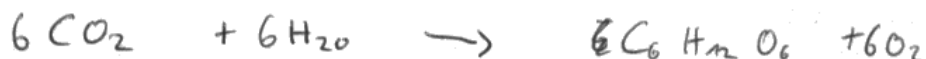


This answer gains one mark for correct formulae.

3 Photosynthesis in green plants uses light energy to produce carbohydrates.

(a) Give the balanced chemical symbol equation for photosynthesis.

(2)

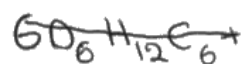


This answer also gains both marks.

3 Photosynthesis in green plants uses light energy to produce carbohydrates.

(a) Give the balanced chemical symbol equation for photosynthesis.

(2)



Carbon dioxide + water $\longrightarrow$ glucose + oxygen



This answer also gains one mark for correct formulae.

Question 3(b)(i)

In Q03(b)(i) candidates were asked to use data from the table to calculate the mean number of bubbles released in one minute when the lamp is 5 cm from the test tube. Almost all responses could correctly calculate the mean.

The table shows the student's results.

Distance of lamp from test tube in cm	Number of bubbles released in one minute			
	count 1	count 2	count 3	mean (average)
35	9	11	8	9
30	10	12	9	10
25	16	17	14	16
20	23	20	24	22
15	30	32	29	30
10	40	37	39	39
5	42	40	41	41

- (i) Calculate the mean number of bubbles released in one minute when the lamp is 5 cm from the test tube.

(2)

mean number = 41



The correct answer gains both marks.

The table shows the student's results.

2-

Distance of lamp from test tube in cm	Number of bubbles released in one minute			
	count 1	count 2	count 3	mean (average)
35	9	11	8	9
30	10	12	9	10
25	16	17	14	16
20	23	20	24	22
15	30	32	29	30
10	40	37	39	39
5	42	40	41	34.6

- (i) Calculate the mean number of bubbles released in one minute when the lamp is 5 cm from the test tube.

(2)

$$42 + 40 + 41 = 123$$

$$\frac{123}{3} = 41$$

mean number = 34.6



The answer is incorrect but the working gains one mark for 123.

The table shows the student's results.

Distance of lamp from test tube in cm	Number of bubbles released in one minute			
	count 1	count 2	count 3	mean (average)
35	9	11	8	9
30	10	12	9	10
25	16	17	14	16
20	23	20	24	22
15	30	32	29	30
10	40	37	39	39
5	42	40	41	42 40

- (i) Calculate the mean number of bubbles released in one minute when the lamp is 5 cm from the test tube.

(2)

$$\frac{42 + 40 + 41}{3}$$

mean number = 40



The answer is incorrect but working gains one mark for 42+40+41.

The table shows the student's results.

Distance of lamp from test tube in cm	Number of bubbles released in one minute			
	count 1	count 2	count 3	mean (average)
35	9	11	8	9
30	10	12	9	10
25	16	17	14	16
20	23	20	24	22
15	30	32	29	30
10	40	37	39	39
5	42	40	41	

- (i) Calculate the mean number of bubbles released in one minute when the lamp is 5 cm from the test tube.

(2)

mean number = 123



The answer is incorrect but the working gains one mark for 123.

Question 3(b)(ii)

In Q03(b)(ii) candidates were asked to give the independent variable in this investigation. Some responses incorrectly wrote number of bubbles choosing the dependent variable rather than the independent.

(ii) Give the independent variable in this investigation.

(1)

the distance of the lamp



This response scores the mark.

(ii) Give the independent variable in this investigation.

(1)

number of bubbles released



This is the dependent variable so no marks.

(ii) Give the independent variable in this investigation.

(1)

the one minute period



No marks for this answer.

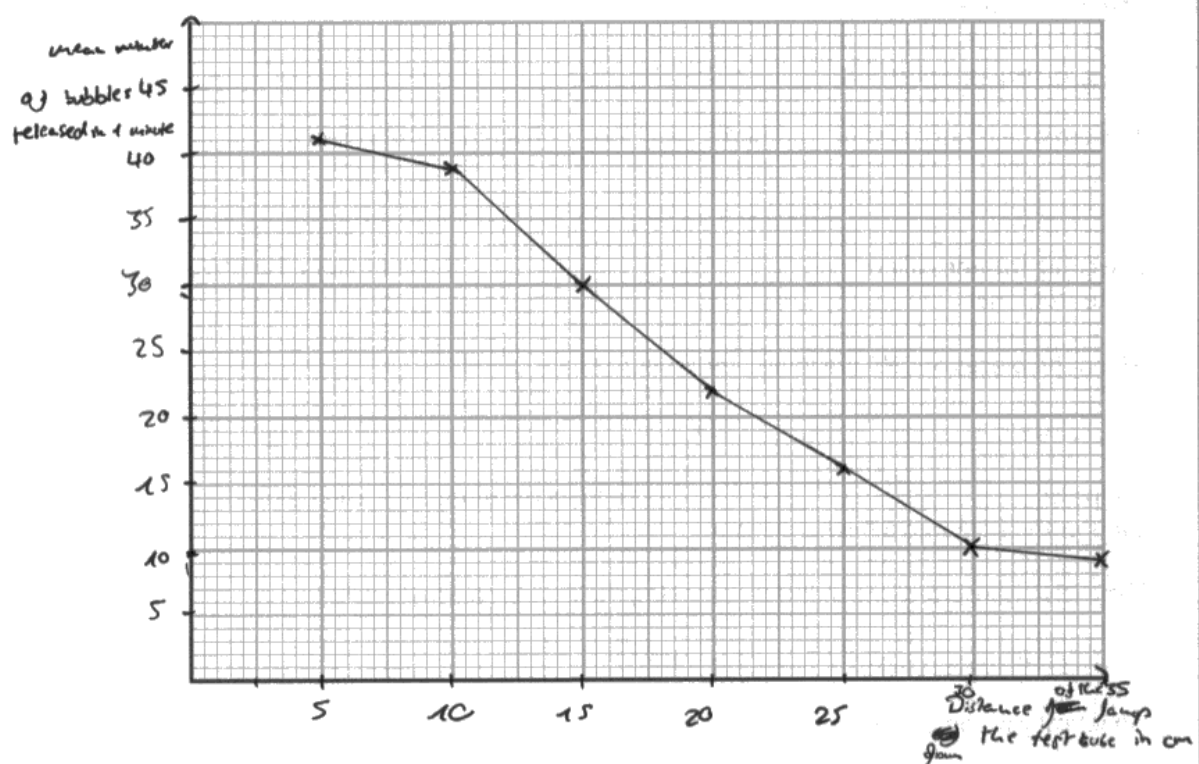
Question 3(b)(iii)

In Q03(b)(iii) candidates were asked to plot a line graph to show the relationship between distance of lamp from test tube and mean number of bubbles released. They were told to use a ruler to join the points with straight lines. Many candidates had practised graphs and their responses scored full credit. Some candidates made the answer more difficult by choosing an inappropriate scale.

- (iii) Plot a line graph to show the relationship between distance of lamp from test tube and mean number of bubbles released.

Use a ruler to join your points with straight lines.

(5)

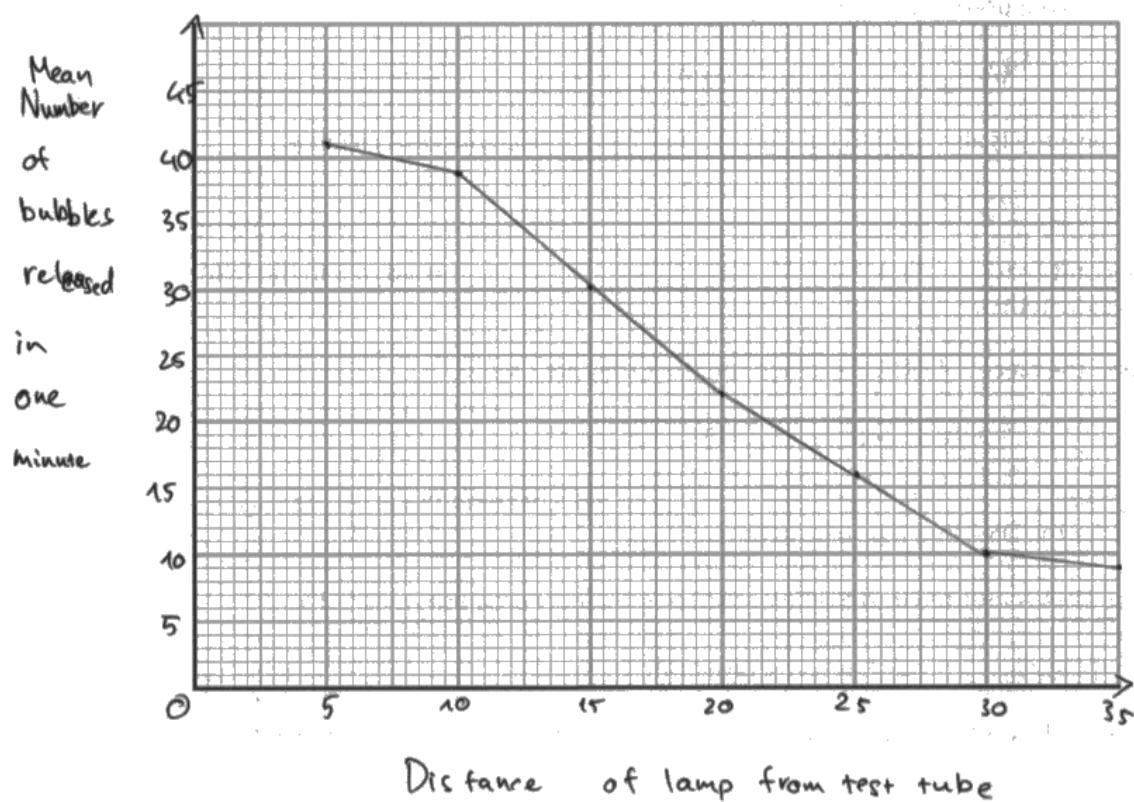


This response scores full marks.

- (iii) Plot a line graph to show the relationship between distance of lamp from test tube and mean number of bubbles released.

Use a ruler to join your points with straight lines.

(5)

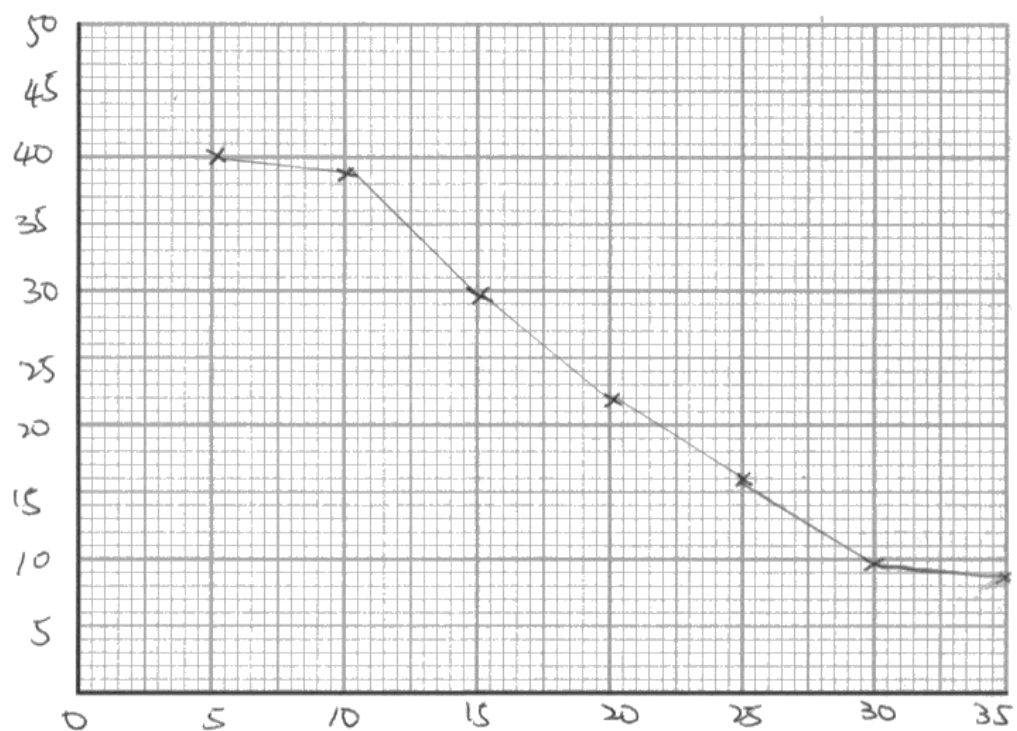


This response scores four marks as no units are given on the x axis.

- (iii) Plot a line graph to show the relationship between distance of lamp from test tube and mean number of bubbles released.

Use a ruler to join your points with straight lines.

(5)



This response also scores four marks as no units are given on the x or y axis. The plot for 5cm was ignored in judging the P mark as this was calculated in Q03(b)(i) in order not to penalise candidates for calculating the wrong mean.

Question 3(b)(iv)

Q03(b)(iv) required candidates to describe the relationship between distance of lamp from test tube and mean number of bubbles released. Most scored one mark with the best responses also noting that the relationship was a negative correlation.

(iv) Describe the relationship between distance of lamp from test tube and mean number of bubbles released.

(2)

When the distance is larger the mean ends up being smaller meaning that they have a negative correlation.



This response scores both marks.

(iv) Describe the relationship between distance of lamp from test tube and mean number of bubbles released.

(2)

closer the lamp is too the test tube more bubbles are released in one minute (negative correlation)



This response also scores both marks.

- (iv) Describe the relationship between distance of lamp from test tube and mean number of bubbles released.

(2)

When the distance is the most farthest away from the water in the test tube the number of the ~~particulates~~ bubbles are low whereas when the distance is closer it increases the rate of bubbles.

(Total for Question 3 = 12 marks)



This response scores one mark.

Question 4

In question 4 candidates were asked to complete the passage about genetic modification by writing a suitable word in each blank space. Most responses gained credit with the best scoring all seven marks.

- 4 Genetic modification involves the use of enzymes to remove DNA and insert it into another organism.

Complete the passage about genetic modification by writing a suitable word in each blank space.

(7)

The enzyme used to cut DNA at a specific site is known as a

..... Restriction enzyme.

This enzyme is also used to cut open a small loop of bacterial DNA called a

..... plasmid

A second enzyme called ligase is used to join the DNA pieces together.

When the pieces of DNA are joined together they are called

..... Recombinant DNA.

A type of virus called a bacteriophage can be used to transfer the DNA into a new organism.

If the DNA is inserted into a different species, the new organism is called a

..... transgenic organism.

Genetically modified bacteria are used to produce the human hormone called

..... insuline



This response correctly fills all the gaps and scores seven marks.

- 4 Genetic modification involves the use of enzymes to remove DNA and insert it into another organism.

Complete the passage about genetic modification by writing a suitable word in each blank space.

(7)

The enzyme used to cut DNA at a specific site is known as a

.....restrictive..... enzyme.

This enzyme is also used to cut open a small loop of bacterial DNA called a

.....plasmid.....

A second enzyme calledligase..... is used to join the DNA pieces together.

When the pieces of DNA are joined together they are called

.....recombinant..... DNA.

A type ofcell..... called a bacteriophage can be used to transfer the DNA into a new organism.

If the DNA is inserted into a different species, the new organism is called a

.....transgenic..... organism.

Genetically modified bacteria are used to produce the human hormone called

.....insulin.....



This response scores six marks as all gaps are correct except 'cell' in gap 5.

- 4 Genetic modification involves the use of enzymes to remove DNA and insert it into another organism.

Complete the passage about genetic modification by writing a suitable word in each blank space.

(7)

The enzyme used to cut DNA at a specific site is known as a

~~restriction~~ ^{restriction} enzyme.

This enzyme is also used to cut open a small loop of bacterial DNA called a

^{protein}

A second enzyme called ^{ligase} ~~ligase~~ is used to join the DNA pieces together.

When the pieces of DNA are joined together they are called

^{mutated} ~~genetically modified~~ DNA.

A type of ^{virus} called a bacteriophage can be used to transfer the DNA into a new organism.

If the DNA is inserted into a different species, the new organism is called a

^{genetically modified} organism.

Genetically modified bacteria are used to produce the human hormone called

~~insulin~~ ^{insulin} insulin.



This response scores four marks with gaps 2, 4 and 6 being incorrect.

Question 5(b)

Q05(b) asked candidates to describe the role of digestive enzymes in the small intestine. The best responses were able to describe how digestive enzymes break down large molecules into smaller ones, that can then be absorbed into the blood by villi. The best responses also include description of amylase breaking down starch into maltose, maltase breaking down maltose into glucose. Lipase digesting lipid into fatty acids and glycerol and proteases digesting protein into amino acids.

(b) Describe the role of digestive enzymes in the small intestine.

(4)

Break - Enzymes such as lipase, maltase are in the small intestine.
- Lipase is a enzyme that breaks down fat ^{molecules} particles into fatty acids and glycerol for absorption by the villi.
= Maltase breaks down ^{disaccharides} maltose into ^{monosaccharide} glucose that's absorbed by the villi.
- Digestive enzymes break down big molecules into smaller ones to be absorbed.



This response scores four marks for lipase breaks down fat into fatty acids (mp5), absorption by villi (mp6 and mp7), Maltase breaking down maltose into glucose (mp3), and enzymes break down large molecules into smaller ones (mp1).

(b) Describe the role of digestive enzymes in the small intestine.

(4)

In the small intestine, amylase breaks down starch into glucose. Lipids are broken down by ~~lipase~~ lipase into fatty acids. ~~because they are cannot be absorbed~~
Protein is broken down into amino acids by protease. All the nutrients needed are then absorbed in the villi.



This response also scores four marks, ie mp 2, mp 5, mp6 and mp7.

(b) Describe the role of digestive enzymes in the small intestine.

(4)

The food is ~~absorbed~~ ~~absorbed~~ absorbed, by the wall ~~of~~
in the small intestine. Villi are on the wall in the small intestine
to increase the surface area. This is a chemical reaction.
Enzymes are here to speed up the process of digestion.



This response scores two marks for absorption (mp6) and by villi (mp7).

Question 5(c)(i)

In Q05(c)(i) candidates were asked to give the meaning of the term control group. The best responses wrote that the control group would not have the probiotic drink.

(c) Consuming living microorganisms, called probiotics, may have health benefits.

One benefit is the reduction of diarrhoea in patients taking antibiotics.

Diarrhoea is the production of more frequent watery faeces and can be caused by the pathogen *Clostridium difficile*.

Scientists investigate the effect that probiotic drinks have on patients developing diarrhoea and on patients having *Clostridium difficile* bacteria in their faeces.

The scientists give some patients a probiotic drink and compare these patients with a control group.

The table shows the scientists' results.

Patient group	Number of patients	Number of patients with diarrhoea	Number of patients with <i>Clostridium difficile</i> in their faeces
probiotic drink	57	7	0
control	56	19	17

(i) Give the meaning of the term **control group**.

(1)

they control the patients that do not get given a probiotic drink.



This answer scores the mark.

- (c) Consuming living microorganisms, called probiotics, may have health benefits.

One benefit is the reduction of diarrhoea in patients taking antibiotics.

Diarrhoea is the production of more frequent watery faeces and can be caused by the pathogen *Clostridium difficile*.

Scientists investigate the effect that probiotic drinks have on patients developing diarrhoea and on patients having *Clostridium difficile* bacteria in their faeces.

The scientists give some patients a probiotic drink and compare these patients with a control group.

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Patient group	Number of patients	Number of patients with diarrhoea	Number of patients with <i>Clostridium difficile</i> in their faeces
probiotic drink	57	7	0
control	56	19	17

- (i) Give the meaning of the term **control group**.

(1)

Group who has the same issue and who
haven't taken the probiotic



This answer also gains the mark.

- (c) Consuming living microorganisms, called probiotics, may have health benefits.

One benefit is the reduction of diarrhoea in patients taking antibiotics.

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control	56	19	17

- (i) Give the meaning of the term **control group**.

(1)

The group that was controlled



No credit for this response.

(c) Consuming living microorganisms, called probiotics, may have health benefits.

One benefit is the reduction of diarrhoea in patients taking antibiotics.

Diarrhoea is the production of more frequent watery faeces and can be caused by the pathogen *Clostridium difficile*.

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Patient group	Number of patients	Number of patients with diarrhoea	Number of patients with <i>Clostridium difficile</i> in their faeces
probiotic drink	57	7	0
control	56	19	17

(i) Give the meaning of the term **control group**.

(1)

Patients are the same (sex, weight)



No credit for this answer.

Question 5(c)(ii)

Q05(c)(ii) gave a table showing the results of an investigation into the effect that probiotic drinks have on patients developing diarrhoea and on patients having *Clostridium difficile* bacteria in their faeces.

Candidates were asked to discuss whether the results show links between having a probiotic drink and the likelihood of developing diarrhoea or having *Clostridium difficile* in the faeces.

Candidates were told to use information from the table and your own knowledge in their answer. The best candidates could use the data to evaluate the effect that the drink had on developing diarrhoea and having *Clostridium difficile* in their faeces. They could also comment on the size and design of the study.

- (ii) Discuss whether the results show links between having a probiotic drink and the likelihood of developing diarrhoea or having *Clostridium difficile* in the faeces.

Use information from the table and your own knowledge in your answer.

(5)

→ yes because - about same amount of people
- significant reduction of diarrhoea
with probiotics - 7, in comparison to without 19 -
almost 3x as much
- with probiotics - 0 patients with *Clostridium*
difficile → without probiotics 17
- no because - experiment wasn't repeated multiple
times - low accuracy
- no idea about circumstances; age,
health, immunosystem
- ^{link} are valid
- Both arguments for & against results ~~showing there~~
~~is a link~~ → I think there is a link, even if not as
extreme as shown the experiment



This response gains all five marks. It scores similar numbers in each group (mp2). Fewer patients with diarrhoea in probiotic group (mp3). No patients with *Clostridium* in probiotic group (mp5). Study not repeated (mp1). No information about age or health of patients (mp10).

- (ii) Discuss whether the results show links between having a probiotic drink and the likelihood of developing diarrhoea or having *Clostridium difficile* in the faeces.

Use information from the table and your own knowledge in your answer.

(5)

In the table we can identify that the group that had the probiotic drink had less number of patients with either diarrhoea or *Clostridium difficile* in their faeces. This could mean that the probiotic drink lowers the problems. The number of patients with *Clostridium difficile* in their faeces has completely vanished. This means that the probiotic drink may be a medicine that "kills" the bacteria. The number of patients with diarrhoea is not completely gone but almost. But with this investigation we have to consider, that it only was a small group of people, therefore the reliability could be questioned. The independent variable is the probiotic drink, the dependent is the number of patients with diarrhoea or the bacterium.



This response scores four marks. Fewer patients with diarrhoea (mp3). None with *Clostridium* (mp5). some patients in probiotic group still have diarrhoea (mp7) and small study (mp 1).

- (ii) Discuss whether the results show links between having a probiotic drink and the likelihood of developing diarrhoea or having *Clostridium difficile* in the faeces.

Use information from the table and your own knowledge in your answer.

(5)

- The results show links ~~between~~
- There are 12 less patients with diarrhoea who ~~had~~ ^{drank} the probiotic drink than those who didn't drink it
- The probiotic drink ~~decreases the number of people~~ ^{reduces diarrhoea in patients taking antibiotics}
- There are none patients with *Clostridium difficile* in their faeces who drank the probiotic drink, while still 17 out of 56 ~~had the pathogen~~ who didn't drink it, had the pathogen
- The probiotic drink kills (probably) any *Clostridium difficile* pathogens
- If they used even more patients, maybe one or two still would have had the pathogen in their faeces
- The investigation ^{still} used 57 patients, so its ~~results~~ ^{are} very reliable



This response scores three marks. Fewer patients with diarrhoea (mp3). No patients with *Clostridium* (mp5). Probiotic kills *Clostridium* (mp9).

Question 6

Finally, the last question was the experimental design item. It asked candidates to design an investigation to find out if adding salt to washing powder can improve stain removal. Candidates who had practised this type of items often gave very good answers and gained high marks. A few responses did not describe an investigation.

6 Enzymes in biological washing powders help remove stains from clothing.

Some people claim that adding salt to washing powder can improve stain removal.

Design an investigation to find out if adding salt to washing powder can improve stain removal.

Include experimental details in your answer and write in full sentences.

(6)

- Provide three baskets with same/similar stains, same clothing, same temp of water, and the same washing powder.
- Keep one ^(first) basket as a control group. wash by hand and record result.
- In one ^(second) basket, add a cup of salt and wash by hand and record result.
- In the ^(third) other basket, use a different kind of salt, wash by hand and record result.
- When you wash by hand, make sure you have a timer ~~to~~ set to 5 minutes or however much you need. Just keep them the same.
- Let them dry and record result.
- Compare the data between the three groups; both wet result & dry result.
- Repeat experiment for a much more reliable result.
- Safety precaution: wear rubber gloves as washing powders can be bad for human skin if the contact is ~~prolonged~~ prolonged. ~~not good~~



This response gains full marks for: S2 use same stains. S1 use same temperature. O use same powder. C add salt and no salt. M2 wash for 5 minutes. R repeat.

6 Enzymes in biological washing powders help remove stains from clothing.

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Design an investigation to find out if adding salt to washing powder can improve stain removal.

Include experimental details in your answer and write in full sentences.

(6)

when doing an experiment make sure to use the same amount of salt, have the same temperature water, repeat experiment 3-4 times, use same material of clothing, ~~use same material~~, use the same ~~st~~ thing that stained (e.g. blueberries), use same washing powder.

To see how much salt to use repeat the experiment 3-4 times with different amounts of salt to see what amount works best, you can also try with different water temperatures to see if warm or cold water works best.



This response scores five marks. S1 same temperature. R repeat. S2 same clothing. O same powder and C use different amounts of salt.

6 Enzymes in biological washing powders help remove stains from clothing.

Some people claim that adding salt to washing powder can improve stain removal.

Design an investigation to find out if adding salt to washing powder can improve stain removal.

Include experimental details in your answer and write in full sentences.

(6)

- Prepare two clothes with same type of stains e.g. oil and same size of stains.
- ~~Prepare~~ • One cloth washed by washing powder and one use ~~to~~ add salt to washing powder.
- Use same temperature of water to remove stains, time the time of each group get cleaned cloth.
- Repeat ~~the~~ it ~~&~~ for ~~2~~ three times.
- Get mean time.
- ~~If the~~ The group who use short time ~~will be~~ ^{is} have greater stain removal.
- Also the ~~tot~~ mass of and type of washing powder should be same.



This response also scores five marks. S2 same stains. C add salt. S1 same temperature. R repeat. And O same type of washing powder.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Ensure that you read the question carefully and include sufficient points to gain full credit.
- Make sure you know all of the content in the specification including the balanced chemical equation for photosynthesis.
- Include as many points as there are marks available in comment or discuss items.
- Make sure you are familiar with the core practicals listed in the specification.
- Make sure you have practised calculations and always include all your working.
- Make links between different parts of the specification, and when considering a question remember to use all the knowledge and understanding you have gained throughout the specification.
- Be able to use genetic diagrams correctly and understand inheritance.
- Be able to name the dependent and independent variable in experiments, and in experimental design questions give the independent variable and range of values, the dependent variable, how you are going to measure it and the control variables and explain how these will be controlled.
- Always read through your responses and ensure that what you have written makes sense and answers the question fully.

Grade boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
<https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html>

