

Examiners' Report

June 2018

IAL Biology WBI03 01

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Introduction

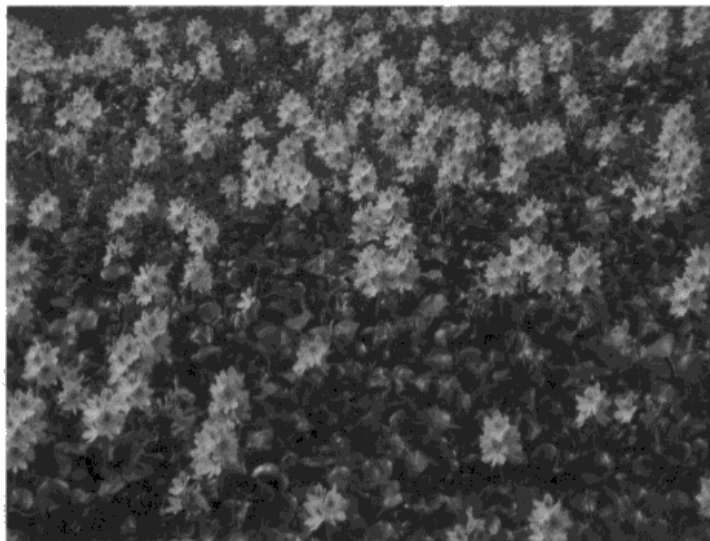
This paper showed a very pleasing level of performance. The most challenging questions proved to be 2dii and 2ci with the most accessible 2ai and 2aii.

As ever for Question 1, it is important that candidates are thoroughly familiar with all of the nine core practicals. This means the basic practical, as carried out or seen, together with all of the background theory and data analysis. WBI03 is a skills-based paper **but** knowledge is still needed in these areas. For Question 2, it is essential that candidates are familiar with  requirements of the domestic visit/issue report. These can be found on page 76 of the current specification.

Question 1 (a) (i)

This question was generally well done with over 80% of candidates gaining the mark. However, there are still some who struggle with the variable types. Confusion with the DV (glucose concentration) or some other control variable (most commonly cellulase) were seen.

- 1 The photograph below shows some water hyacinth plants. These plants contain a lot of cellulose. The cellulose is used for the industrial production of glucose.



Magnification $\times 0.1$

In the production of glucose, cellulose from water hyacinths is mixed with the enzyme cellulase. Cellulase breaks down the cellulose to produce glucose.

In an investigation, different masses of cellulose were added to beakers and the volume made up to 100 cm^3 , using distilled water. Cellulase was also added to each beaker.

After 15 minutes, the concentration of glucose in each beaker was determined.

- (a) (i) State the independent variable in this investigation.

(1)

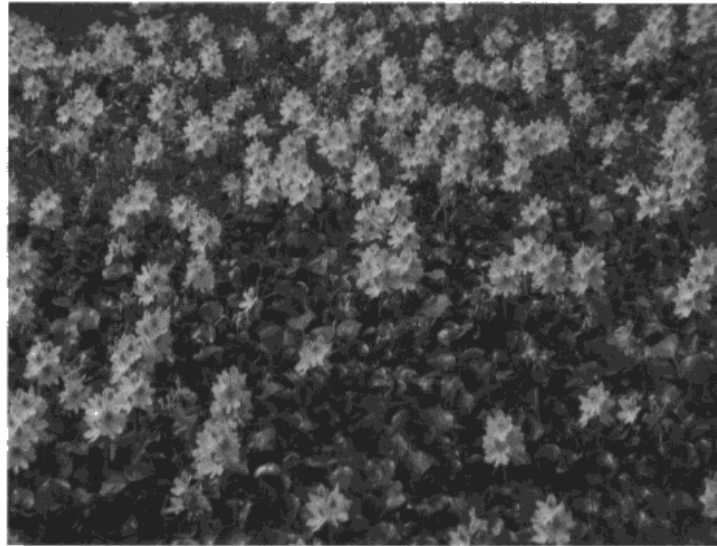
Different masses of cellulose



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Examiner Comments

In this answer the candidate has gained the mark easily by simply quoting from the stem.

- 1 The photograph below shows some water hyacinth plants. These plants contain a lot of cellulose. The cellulose is used for the industrial production of glucose.



Magnification $\times 0.1$

In the production of glucose, cellulose from water hyacinths is mixed with the enzyme cellulase. Cellulase breaks down the cellulose to produce glucose.

In an investigation, different masses of cellulose were added to beakers and the volume made up to 100 cm^3 , using distilled water. Cellulase was also added to each beaker.

After 15 minutes, the concentration of glucose in each beaker was determined.

- (a) (i) State the independent variable in this investigation.

(1)

~~Cellulose~~ Cellulose



Although cellulose is correct it must be qualified with something which makes it a variable. Mass (as in the stem), weight or concentration were all acceptable.



Be sure to understand the differences between IV, DV and control variables.

Question 1 (a) (ii)

This was a somewhat unusual question and very specific to this context. Candidates performed quite pleasingly on it with over 40% gaining full marks. One straight forward mark was available for a clear indication that the candidate knew what the optimum temperature is, despite this nearly 20% failed to score any marks on this question.

(ii) In this investigation, the optimum temperature for cellulase was used.

Explain how the optimum temperature was determined.

(3)

→ the optimum temperature may have been determined by measuring the rate of breakdown in accordance to the temperature which is kept variable or climbing from a lower temperature. the point/temperature where the reaction is highest is the optimum temperature.



ResultsPlus
Examiner Comments

We will always try and give credit where it is felt that a candidate is showing understanding, even though that may not be well expressed. In this example the idea embodied in MP2 about a range of temperatures is discernible, as is that of MP4.

(ii) In this investigation, the optimum temperature for cellulase was used.

Explain how the optimum temperature was determined.

(3)

the optimum temperature of cellulase is determined by using different 5 temperatures 20°C, 25°C, 30°C, 35°C, 40°C and start is experiment using an incubator. Use the same cellulase mass 2g, and the same cellulase volume, leave the reaction for 5 minutes, then check the rate of reaction every 1 minute, then get the one with the highest rate of reaction is the optimum one. Use an incubator to check the optimum temperature.



ResultsPlus
Examiner Comments

Mps 2, 3 and 4 are clear here. This answer thus gained full marks, even though it did not give an acceptable method for finding glucose production. This was quite common, mp1 being quite rarely seen.

Question 1 (a) (iii)

This question was generally very accessible and well answered. However, some did not read it carefully and gave a suitable variable but then followed it up with **and in** inappropriate method of control or misunderstood the second part altogether.



(iii) Name **one** variable, other than temperature, that should be controlled in this investigation.

Describe how this variable could be controlled.

(2)

Variable

~~Temperature~~ pH

How the variable could be controlled

A pH of approximately 7.0 should be used for the enzyme cellulase to function properly.



ResultsPlus
Examiner Comments

As in this answer, pH was by far the most commonly suggested variable. Most candidates were able to suggest the use of a buffer. However some, as here, suggested what the variable should be controlled at rather than how this would be done.

(iii) Name **one** variable, other than temperature, that should be controlled in this investigation.

Describe how this variable could be controlled.

(2)

Variable

~~or~~ Volume of cellulase

How the variable could be controlled

by using a beaker to measure the volume of cellulase



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Examiner Comments

Again, volume of cellulase is a perfectly acceptable answer. However, at advanced level, we would expect a better suggestion than a beaker as a method to measure it.

Question 1 (b) (i)

In calculation questions, one of the most common reasons for lost marks is due to rounding errors. There is nearly always guidance in the question as to how the answer should be rounded. In this case it was expected that the answer would be quoted to the same number of decimal places as all the other rates in the table to which it was to be added.

(b) The table below shows the results of this investigation.

Mass of cellulose / g	Concentration of glucose produced after 15 minutes / g cm ⁻³	Rate of production of glucose / g min ⁻¹
0.25	0.31	0.020
0.50	0.44	0.029
1.00	0.59	0.039
1.50	0.73	0.049
2.00	0.80	0.0533

(i) Calculate the rate of production of glucose for a mass of 2.00 g of cellulose.

Show your working.

(2)

$$1 \text{ min} = 60 \text{ sec}$$

$$\begin{array}{r} 0.73 \quad 15 \\ \times \quad 1 \\ \hline \end{array}$$

$$15x = 0.73 \Rightarrow 0.049$$

~~2.00~~

$$\begin{array}{r} 0.80 \quad 15 \\ \times \quad 1 \\ \hline \end{array}$$

$$15x = 0.80$$

$$x = 0.053$$

$$\underline{0.0533} \text{ g min}^{-1}$$

The calculation here is correct but the answer has been quoted to 4 decimal places instead of the required three.

(b) The table below shows the results of this investigation.

Mass of cellulose / g	Concentration of glucose produced after 15 minutes / g cm ⁻³	Rate of production of glucose / g min ⁻¹
0.25	0.31	0.020
0.50	0.44	0.029
1.00	0.59	0.039
1.50	0.73	0.049
2.00	0.80	0.053

(i) Calculate the rate of production of glucose for a mass of 2.00 g of cellulose.

Show your working.

(2)

~~0.80~~

$$\frac{\text{Concentration of glucose produced}}{15 \text{ minutes}} = \text{Rate of production of glucose}$$

$$\frac{0.80}{15} = x$$

0.053 g min⁻¹

0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.010



A correct answer quoted to the right number of decimal places.

It is very important in all questions to carefully read the command word.

(b) The table below shows the results of this investigation.

Mass of cellulose / g	Concentration of glucose produced after 15 minutes / g cm ⁻³	Rate of production of glucose / g min ⁻¹
0.25	0.31	0.020
0.50	0.44	0.029
1.00	0.59	0.039
1.50	0.73	0.049
2.00	0.80	0.059

(i) Calculate the rate of production of glucose for a mass of 2.00 g of cellulose.

Show your working.

(2)

$$0.049 + 0.01 \\ = 0.059$$

..... 0.059 g min⁻¹



The command word in this question is calculate. However, a large number of candidates thought that they saw some patterns in the data and actually produced an educated guess, rather than a calculation.



Always read the command word, there will be one in every question and it tells you exactly what you need to do in that question.

Question 1 (b) (ii)

The graph plotting question is nearly always one of the highest scoring on this paper. This year was no exception with nearly half of candidates achieving full marks.

(b) The table below shows the results of this investigation.

Mass of cellulose / g	Concentration of glucose produced after 15 minutes / g cm ⁻³	Rate of production of glucose / g min ⁻¹
0.25	0.31	0.020
0.50	0.44	0.029
1.00	0.59	0.039
1.50	0.73	0.049
2.00	0.80	0.053

(i) Calculate the rate of production of glucose for a mass of 2.00 g of cellulose.

Show your working.

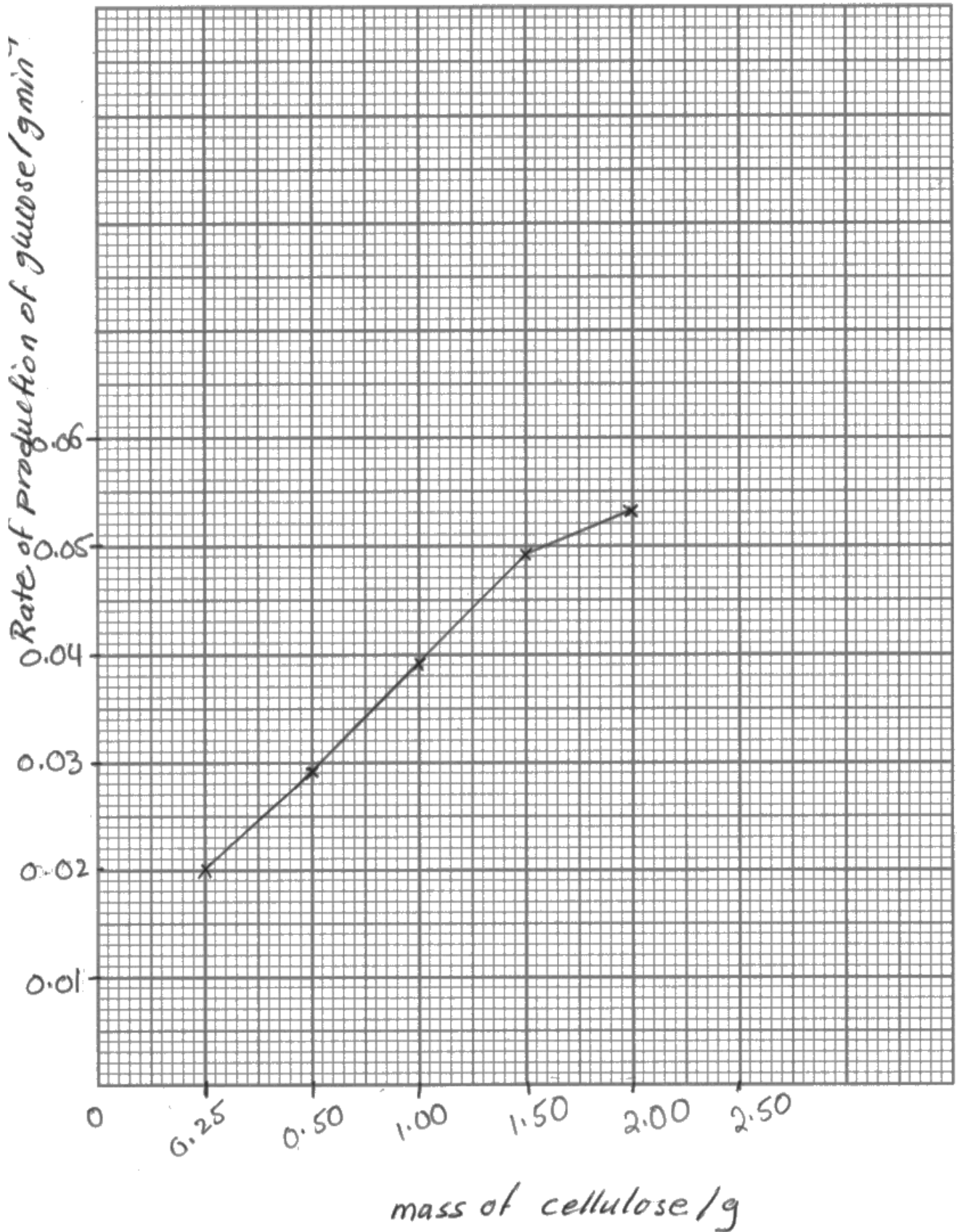
(2)

$$\begin{array}{l} \text{concn} \\ \text{mass} : \text{min} \\ 0.80 : 15 \\ x : 1 \\ \frac{15x}{15} = \frac{0.80}{15} \\ = 0.0533 \end{array}$$

0.053 g min⁻¹

- (ii) Plot a graph to show the relationship between the mass of cellulose used and the rate of production of glucose. Join the points with ruled, straight lines.

(4)





A surprisingly common error on the graph this year was made by candidates who used a non-linear x-axis. In this example a large square represents 0.25 between zero and 0.50. However, between 0.50 and 1 a large square represents 0.50.



It is very unlikely that a non-linear axis would be appropriate.

(b) The table below shows the results of this investigation.

Mass of cellulose / g	Concentration of glucose produced after 15 minutes / g cm ⁻³	Rate of production of glucose / g min ⁻¹
0.25	0.31	0.020
0.50	0.44	0.029
1.00	0.59	0.039
1.50	0.73	0.049
2.00	0.80	0.053

(i) Calculate the rate of production of glucose for a mass of 2.00 g of cellulose.

Show your working.

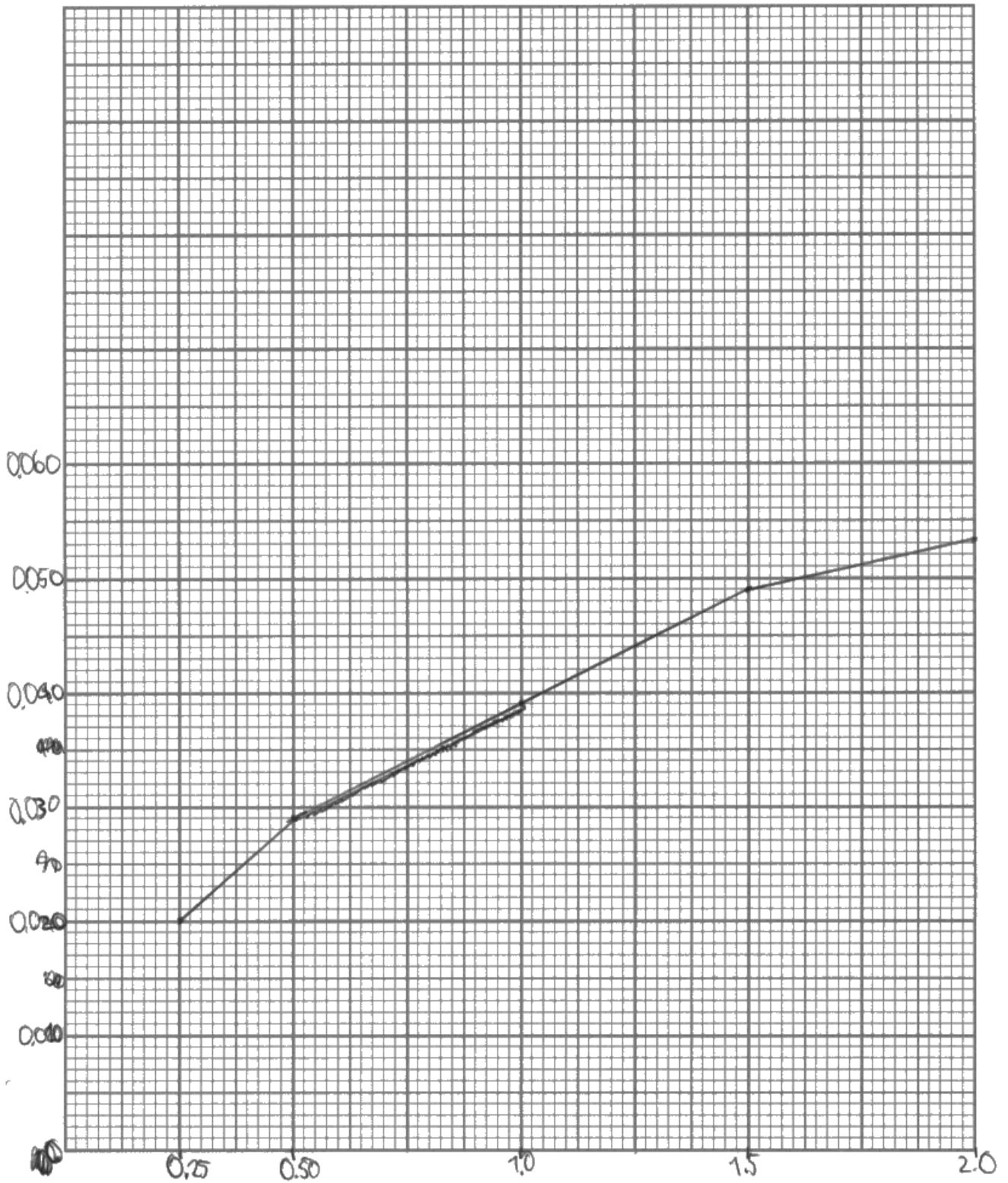
(2)

$$0.80 : 15 = 0.0533333$$

$$\underline{0.053} \dots \text{g min}^{-1}$$

(ii) Plot a graph to show the relationship between the mass of cellulose used and the rate of production of glucose. Join the points with ruled, straight lines.

(4)





It has always been common for candidates to fail to label the axes on their graphs. In this example, one mark is lost for that omission. In addition, the relatively simple task of joining the points with ruled straight lines has not been very well executed.



A graph is a visual representation of data. Its axes always need to be labelled. Although much latitude is given when it comes to the quality of presentation of work, carelessness and untidiness in graph plotting may lead to a penalty.

Question 1 (c)

It is very common for candidates to earn their marks at the very end of their response. This shows that they are not thinking before putting pen to paper and often leads to unstructured answers which are unlikely to get full marks.

(c) Suggest how the variability of the results could be measured and shown on a graph.

(4)

The variabilities could be measured and shown on a graph by using a bar chart. ~~(Then)~~ The variabilities could be measured using a pipette or a measuring cylinder to obtain an accurate value. Such as measure the (~~cellulase~~) cellulase concentration and volume of water used in an accurate way ^{as mentioned} ~~(by means)~~ above. Then the time ~~(could be)~~ should be recorded using a stop watch. At last the experiment should be repeated calculating the mean and present in a bar chart.



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Examiner Comments

This candidate picks up the first marking point on the third line from the end of the response and then the second marking point on the second line from the end.



Try to pause for a few moments before you write to think about what you are going to put. It can seem difficult to do this when you are up against time in an exam. But exams are not about an hour and a half of writing but an hour and a half of thinking AND writing.

This question was often very well answered and nearly half of candidates achieved full marks.

(c) Suggest how the variability of the results could be measured and shown on a graph.

(4)

repeat the experiment ^{multiple} ~~multiply~~ of lines ~~off~~ under the same conditions and calculate mean. calculate standard deviation and plot error bars of the graph. ~~look if the standard deviation is compared to~~ look for overlapping of error bars and ~~analyse~~ more data. look if the standard deviation is much larger or smaller than mean. ~~the~~ error bars could be shown on graph by taking the standard deviation and adding (and subtracting) 1, above and below the point.



This example shows how a candidate who understands measurement and display of variability can pick up the marks very easily. All four marking points have been achieved within the first five lines of writing.

Question 1 (d)

The item at the end of Q1 nearly always requires some sort of overall conclusion. For this reason, it is often found to be quite demanding and not very mark yielding. It was pleasing, therefore, to see some good scores on this item. However, very few (less than 5%) were able to score 4. It was clear that this was because they had not realised that more than one conclusion was required. The mark scheme was structured so that full marks were given only to those who at least began to explore more than one line of thought. Many were able to follow through on the ideas represented in MP1-3. Very few, however, realised that the relationship is non-linear and that this may be an argument for not using the obvious 9 a.u. concentration.

(d) In another investigation, the effect of cellulase concentration on the rate of glucose production was studied. The table below shows the results of this investigation.

Cellulase concentration / a.u.	Rate of glucose production / g min ⁻¹
1.0	0.35
3.0	0.43
6.0	0.59
9.0	0.71
18.0	0.71

Using the data in the table above, suggest conclusions that could be made about the cost effectiveness of using cellulase to produce glucose in industrial processes.

(4)

As the cellulase concentration increase rate of glucose production will increase. using more concentration of cellulase costs more / expensive. use less concentration of cellulase.



ResultsPlus
Examiner Comments

No use of the data is made in this answer. It achieves only MP3.



When asked in a question to make use of some data, you will not gain many marks if you do not do that.

(d) In another investigation, the effect of cellulase concentration on the rate of glucose production was studied. The table below shows the results of this investigation.

Cellulase concentration / a.u.	Rate of glucose production / g min ⁻¹
1.0	0.35
3.0	0.43
6.0	0.59
9.0	0.71
18.0	0.71

0.16
0.12

Using the data in the table above, suggest conclusions that could be made about the cost effectiveness of using cellulase to produce glucose in industrial processes.

(4)

- As cellulase concentration increases, the rate of glucose production increases.
- When concentration is at 1 a.u., the rate is 0.35 g min⁻¹; whereas in 3 a.u., the rate increases to 0.43 g min⁻¹.
- However, when concentration of cellulase exceeds 9 a.u., the rate is kept constant, so it is pointless for industry to use cellulase at with too high concentrations.
- The optimum concentration would be 9 a.u., as it results in the highest rate of glucose production.
- However, industry may consider using 6 a.u., as the % increase of rate is the highest between 3 a.u. and 9 a.u.



This answer is one of the few which suggest that a conclusion outside of the rather obvious one of not using above 9 a.u. is possible.

Question 2 (a) (i)

As is always the case, the command word was very important in this question. Here it is explain and calls for more than a simple description, although that is part of it. There was one mark for having seen that the use of oxytocin is the main focus of the report. Some indication as to what this chemical does was required for the second mark, not just some further description such as 'in a nasal spray'. Command words are not used in pairs, this means that when an explanation is required it will need to be preceded by a description, as here. A description is not needed if the information is given, so 'oxytocin is the main solution to the problem of HF-ASD discussed in this report, explain why' is a different question.

(a) (i) The problem discussed in this report is the condition HF-ASD.

Explain the main solution for this problem, proposed in paragraphs 3 to 8 of this report.

(2)

The use of Oxytocin. Oxytocin was used in order to increase social behavior in people with HF-ASD, due to the fact that it helps with the development of voluntary social behavior.



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Examiner Comments

This is a clear 2 mark response, and there were many like it with over 90% gaining 2 marks.

(a) (i) The problem discussed in this report is the condition HF-ASD.

Explain the main solution for this problem, proposed in paragraphs 3 to 8 of this report.

(2)

Using oxytocin usingⁱⁿ a nasal spray (inhalation)



ResultsPlus
Examiner Comments

This is a typical 1 mark answer which fails to explain why oxytocin is a possible solution.

Question 2 (a) (ii)

In this question the command word is describe and it is worth 2 marks. Most candidates found this question accessible with over 90% gaining both marks.

(ii) Describe **one** alternative solution for this problem outlined in the report.

(2)

Applied Behaviour Analysis (ABA).
Considers the behaviour of patients to positive & negative aspects of environment.
Show ~~healthy~~^{healthy} behaviour & they also learn to ~~be~~ repeat those healthy behaviours.



A typical 2 mark answer in which one of the two alternative solutions has been identified and then some further description given.

(ii) Describe **one** alternative solution for this problem outlined in the report.

(2)

Applied behavioural analysis is said to be the most effective treatment for patients with HF-ASD

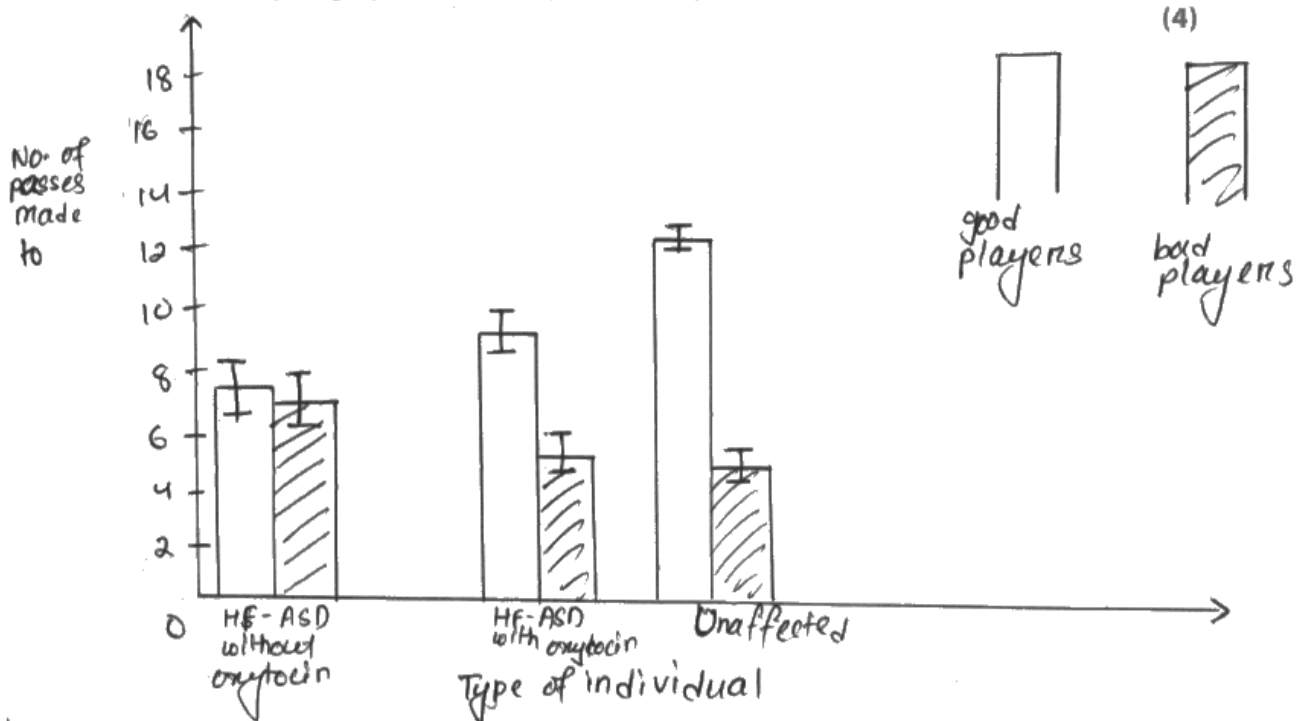


A typical 1 mark answer where the alternative solution has been identified but no further description given to warrant a second mark.

Question 2 (b)

(b) An issue report should contain visuals.

Draw a suitable visual that presents the results of Elissar Adari's investigation, described in paragraph 5, in a comparative way.



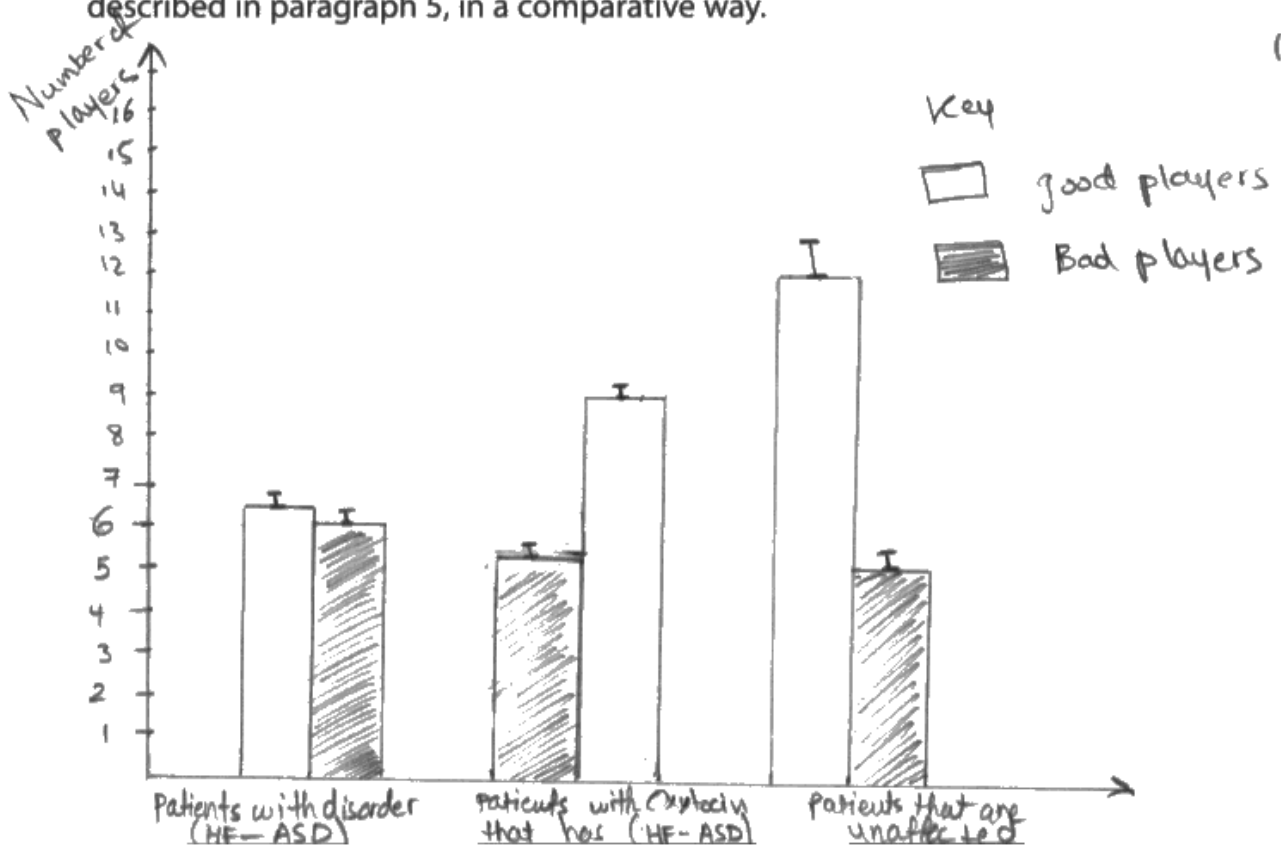
ResultsPlus
Examiner Comments

A carefully presented visual which gained full marks.

(b) An issue report should contain visuals.

Draw a suitable visual that presents the results of Elissar Adari's investigation, described in paragraph 5, in a comparative way.

(4)

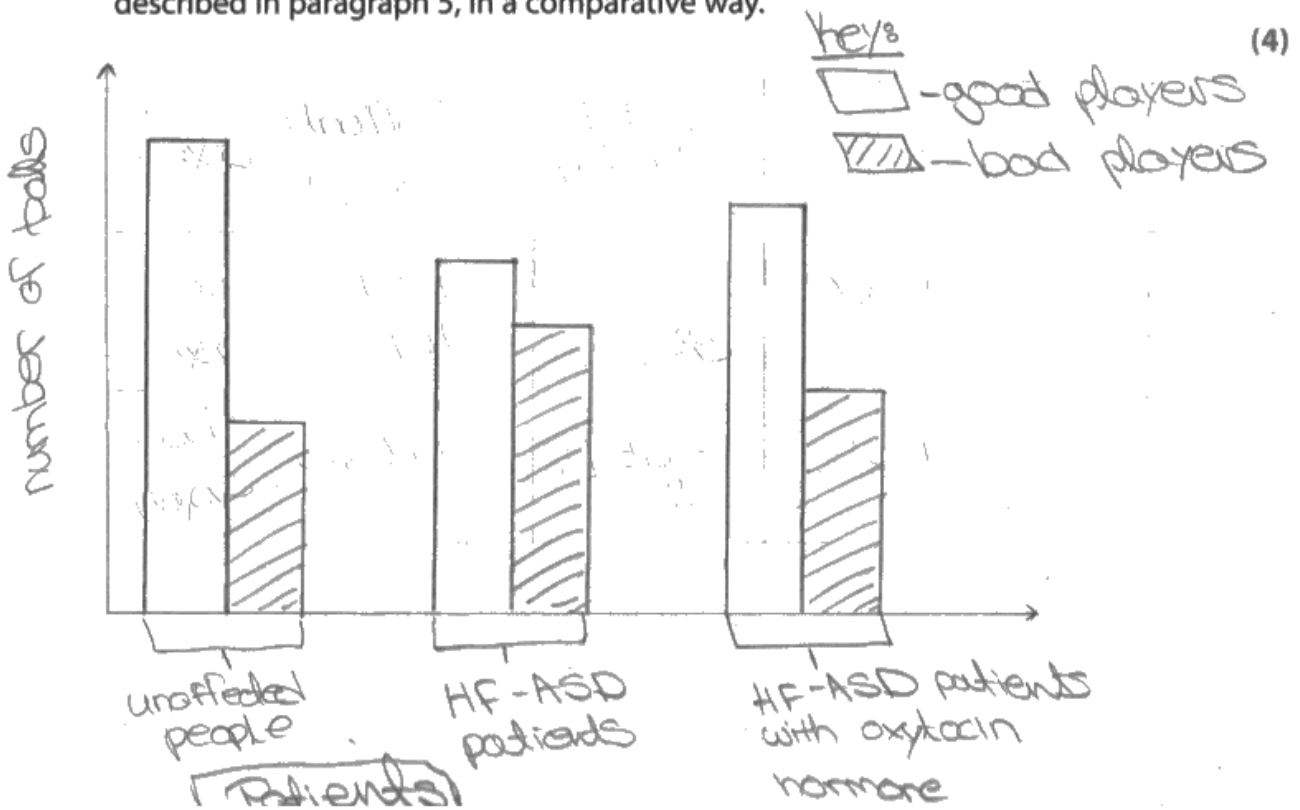


ResultsPlus
Examiner Comments

A nicely presented visual but unfortunately gaining only three marks as the Y axis label is inappropriate.

(b) An issue report should contain visuals.

Draw a suitable visual that presents the results of Elissar Adari's investigation, described in paragraph 5, in a comparative way.



ResultsPlus
Examiner Comments

This is a good response marred only by the lack of standard deviations.

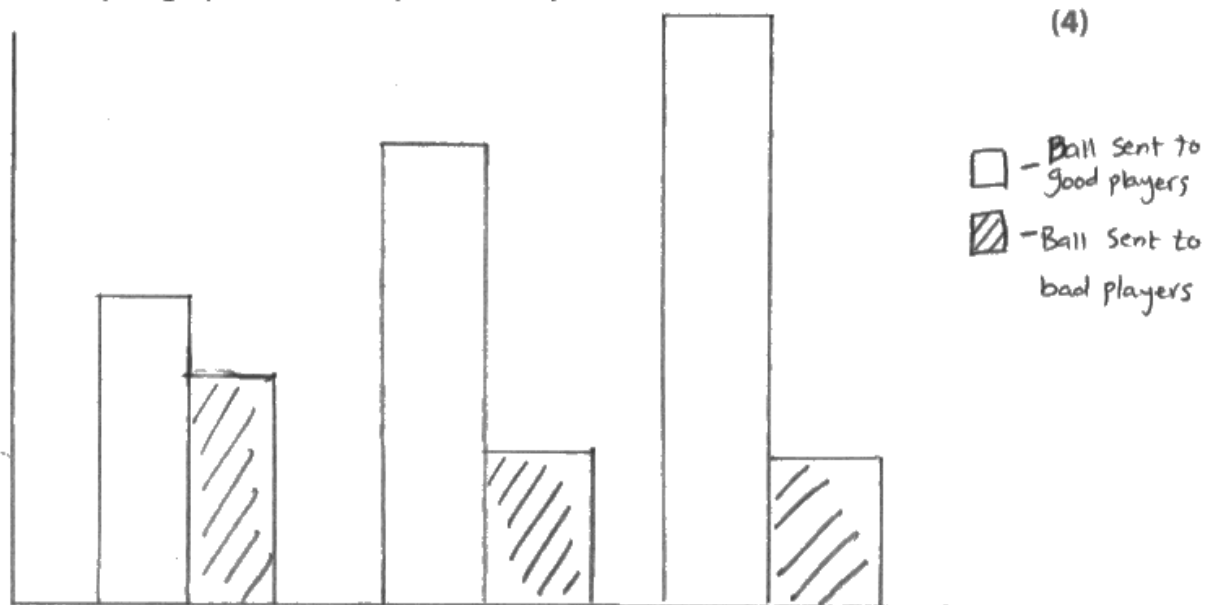


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Examiner Tip

Remember that the results of a scientific investigation include any statistics, such as standard deviation and mean, which may have been calculated.

(b) An issue report should contain visuals.

Draw a suitable visual that presents the results of Elissar Adari's investigation, described in paragraph 5, in a comparative way.



Although at first sight well presented the response gained only one mark. MP1 is not given as there are no axes labels. Since this is the case it is not possible to award MP3 as we do not know which of the subject types each pair of bars represents. Finally, and as in many cases, the standard deviation is not shown and so MP4 cannot be awarded.

Question 2 (c) (i)

- (c) The student made notes about the sources of all the information in the report. The note for Andari's study in this report is shown below.

The paper about the ball game was called Promoting social behaviour with oxytocin in high functioning autism spectrum disorders. It was written by someone called Elissar Andari who was helped by Jean-René Duhamela, Tiziana Zallab, Evelyn Herbrecht, Marion Leboyer and Angela Sirigu. I found it in a journal called Proceedings of the National Academy of Sciences where it was published on March 2, 2010. This journal consists of a number of magazines published over the year. All the magazines for the year make up a volume. This was Volume 107 Magazine number nine. The article was on pages 4389 to 4394.

- (i) Describe how and where this reference should be identified in the report.

(2)

The proper sequence & structure is as follows:
Andari ~~et~~ E, et al (2010), Promoting social behaviour with oxytocin in high functioning autism spectrum disorders, Proceedings of the National Academy of Sciences, (9) 107, (4389-4394). It should be identified at the end of the report, under "references", as a bullet point.



The most common way in which candidates were able to claim one mark on this question was to suggest that the citation should appear at the end of the report.

The reference writing question (2cii on this paper) is usually well done. However in this question an aspect of citing a reference which has not previously been examined was asked for. Consequently, this question was not well done with less than 20% of candidates gaining full marks.

- (c) The student made notes about the sources of all the information in the report. The note for Andari's study in this report is shown below.

The paper about the ball game was called Promoting social behaviour with oxytocin in high functioning autism spectrum disorders. It was written by someone called Elissar Andari who was helped by Jean-René Duhamela, Tiziana Zallab, Evelyn Herbrecht, Marion Leboyer and Angela Sirigu. I found it in a journal called Proceedings of the National Academy of Sciences where it was published on March 2, 2010. This journal consists of a number of magazines published over the year. All the magazines for the year make up a volume. This was Volume 107 Magazine number nine. The article was on pages 4389 to 4394.

- (i) Describe how and where this reference should be identified in the report.

(2)

Paragraph 8 because this reference shows gives a
detailed details on where the research was done
from



This response misidentifies the paragraph where the reference should be cited and gives no idea of how this citation should be done



- (c) The student made notes about the sources of all the information in the report. The note for Andari's study in this report is shown below.

The paper about the ball game was called [Promoting social behaviour with oxytocin in high functioning autism spectrum disorders.] It was written by someone called [Elissar Andari who was helped by Jean-René Duhamela, Tiziana Zallab, Evelyn Herbrecht, Marion Leboyer and Angela Sirigu.] I found it in a journal called [Proceedings of the National Academy of Sciences] where it was published on March 2 [2010.] This journal consists of a number of magazines published over the year. All the magazines for the year make up a volume. This was Volume [107] Magazine number nine. The article was on pages [4389 to 4394.]

- (i) Describe how and where this reference should be identified in the report.

(2)

→ This reference should be identified

in the end of the report in the bibliography section

→ Can be identified by the name of the author, its title, the publication year, volume number and page number. and written in italics.



A rare 2 mark answer.

- (c) The student made notes about the sources of all the information in the report. The note for Andari's study in this report is shown below.

The paper about the ball game was called Promoting social behaviour with oxytocin in high functioning autism spectrum disorders. It was written by someone called Elissar Andari who was helped by Jean-René Duhamela, Tiziana Zallab, Evelyn Herbrecht, Marion Leboyer and Angela Sirigu. I found it in a journal called Proceedings of the National Academy of Sciences where it was published on March 2, 2010. This journal consists of a number of magazines published over the year. All the magazines for the year make up a volume. This was Volume 107 Magazine number nine. The article was on pages 4389 to 4394.

- (i) Describe how and where this reference should be identified in the report.

(2)

The reference should be identified at paragraph 4 where the investigation was summarized. A number should be written in superscript in the report which corresponds to the numbered reference at the end of the report.



One of the best answers seen where the candidate clearly indicates that there should be a citation in paragraph 4 which refers to a reference at the end of the report.

Question 2 (c) (ii)

The reference writing question has proved very accessible over the years but still discriminates well. This year very few candidates gained no marks with over 75% gaining 2 or 3 marks.

- (ii) Using the information in this note, write a full reference to this paper as it should be presented at the end of the report.

(3)

Andari, E et al. (2010). Promoting social behaviour
with oxytocin in high functioning autism disorders.
Proceedings of the National Academy of Sciences.
107(9), (4389-4394)



A well presented and accurate reference.

(ii) Using the information in this note, write a full reference to this paper as it should be presented at the end of the report.

(3)

~~Andari, Elissar, March 2, 2010.~~

Andari, Elissar, et al. March 2, 2010,
Promoting social behaviour with oxytocin in
high functioning autism spectrum disorders,
Proceedings of the National Academy of
Sciences, Volume 107, Magazine number
9, pages 4389 to 4394.



Because of its accessibility the marking of this question is very strict. In this case the failure to express the author's name correctly and the inclusion of a month and day loses the candidate 2 marks.

Question 2 (d) (i)

(d) Some economic implications of this issue are discussed in paragraph 7.

(i) Calculate the cost of 1 IU of oxytocin in Syntocinon nasal spray.

Show your working.

* \$62 per 5cm³ bottle/
* concentration of oxytocin is
10 IU per cm³

10 IU per cm³ ∴ in a ... (2)
5cm³ bottle → 50 IU per cm³

\$62 contains 50 IU per cm³

x ← 1 IU

50x → 62
x → 1.15

\$1.15 for
1 IU of
oxytocin

\$ 1.15



ResultsPlus
Examiner Comments

This one mark response illustrates a number of points. The setting out, although not terrible, leaves something to be desired as it is difficult to see clearly what is in the candidate's mind. It is important for the examiner to do so because the answer on the line is incorrect. On close inspection it becomes clear that the candidate is dividing 62 by 50 and therefore can be awarded MP1, even though the answer is wrong. So, the second point illustrated is that the inclusion of working is important and will be taken into account in the event of an incorrect answer.

(d) Some economic implications of this issue are discussed in paragraph 7.

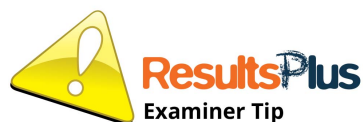
(i) Calculate the cost of 1 IU of oxytocin in Syntocinon nasal spray.

Show your working.

62 dollar for 50 cm³ of ~~oxytocin~~ syntocinon (2)
There is 10 IU of oxytocin in each cm³ so in total we have 50 IU oxytocin
so $\frac{50 \text{ IU oxytocin}}{62 \text{ dollar}} \times \frac{62 \text{ dollar}}{50 \text{ IU oxytocin}} \rightarrow 1.24 \text{ dollar}$
\$ 1.25



This is an unusual but quite instructive response. The answer on the line, which is always the one taken as the candidates final answer if it is there, is incorrect. Sadly although the correct answer appears above, the response can only be awarded one mark.



Make sure that the answer you write on an answer line in a calculation is the one you want to be marked.

As mentioned earlier, marks can be lost in calculation questions for incorrect rounding. The degree of accuracy will vary but there will be something in the question which will guide this. In this case, the candidates were being asked to calculate a cost in dollars and cents. There is, therefore, no case for rounding and the answer should be quoted as \$1.24.

(d) Some economic implications of this issue are discussed in paragraph 7.

(i) Calculate the cost of 1 IU of oxytocin in Syntocinon nasal spray.

Show your working.

(2)

$$\cancel{\$62} : 5 \text{ cm}^3$$

$$10 \text{ IU} : 1 \text{ cm}^3$$

$$1 \text{ IU} : x$$

$$\frac{10x}{10} : \frac{1}{10}$$

$$x = 0.1 \text{ cm}^3$$

$$5 \text{ cm}^3 : \$62$$

$$0.1 \text{ cm}^3 : x$$

$$5x = 0.1 \times 62$$

$$\frac{5x}{5} = \frac{6.2}{5}$$

$$x = 1.24 \text{ \$}$$

\$ 1.24



ResultsPlus
Examiner Comments

Inappropriate rounding to 1.2 lost a mark here.



ResultsPlus
Examiner Tip

Always think very carefully how to round your answer to a calculation. In some cases you may be simply told, quote your answer to a certain number of decimal places or significant figures. In others, however, the 'clue' will be in the question as here.

Question 2 (d) (ii)

In order to allow candidates to access full marks on this question it was possible to award 2 marks if a wrong answer from 2ci was correctly manipulated here. Thus, any answer from 2ci multiplied correctly by 624 would get 2marks.

(d) Some economic implications of this issue are discussed in paragraph 7.

(i) Calculate the cost of 1 IU of oxytocin in Syntocinon nasal spray.

Show your working.

$$\begin{aligned} 10 \text{ IU costs } & \$62 \\ 1 \text{ IU cost} & = \frac{\$62}{10} = \$6.2 \end{aligned} \quad (2)$$

\$ 6.2

(ii) Using your answer to d(i), calculate the total cost of the oxytocin used in Elissar Andari's ball game investigation.

Show your working.

$$\begin{aligned} 1 \text{ IU costs } & \$6.2 \\ 24 \text{ IU } & \text{ ,, } \$6.2 \times 24 = \$148.8 \end{aligned} \quad (2)$$

In one exp, 13 patients were given $\$148.8 \times 13$
In 2 exps, 13 ,, ,, ,, $\$148.8 \times 13 \times 2$
 $= \$3868.8$

\$ 3868.8



Although \$6.2 is incorrect in 2ci, $624 \times 6.2 = 3868.8$ is correct so this response gains 2 marks.

(d) Some economic implications of this issue are discussed in paragraph 7.

(i) Calculate the cost of 1 IU of oxytocin in Syntocinon nasal spray.

Show your working.

$$1 \text{ cm}^3 \text{ contains } 10 \text{ IU} \quad (2)$$

$$5 \text{ cm}^3 \text{ costs } \$62$$

$$1 \text{ cm}^3 \text{ costs } \frac{62}{5} = \$12.4$$

$$10 \text{ IU} \rightarrow 1 \text{ cm}^3$$

$$1 \text{ IU} \rightarrow \frac{1}{10} \text{ cm}^3 = 0.1 \text{ cm}^3$$

$$1 \text{ cm}^3 \rightarrow \$12.4$$

$$0.1 \text{ cm}^3 \rightarrow \$12.4 \times 0.1 = \$1.24$$

$$\underline{\$ 1.24}$$

(ii) Using your answer to d(i), calculate the total cost of the oxytocin used in Elissar Andari's ball game investigation.

Show your working.

$$1 \text{ patient got } 24 \text{ IU} \times 2 = 48 \text{ IU} \quad (2)$$

$$13 \text{ patients got } 48 \times 13 = 624 \text{ IU}$$

$$1 \text{ IU costs } \$1.24$$

$$624 \text{ IU costs } = \$1.24 \times 624$$

$$= \$773.76$$

$$\approx \$773.8$$

$$\underline{\$ 773.8}$$



ResultsPlus
Examiner Comments

Again, this is a cost in \$ so no case for rounding.

Question 2 (e)

An accessible question which, nevertheless, discriminated well. About half the candidates achieved full marks the other half were spread across 0-2marks

(e) Identify **three** ethical implications of the study described in this report.

(3)

- 1 The ~~patients~~ & study does not clarify if the patients truly wanted to take part or not.
- 2 The patients were not given any of their medications other than the oxytocin and this may have affected them, as it disrupted their ~~their~~ daily routine.
- 3 The patient would have to use the oxytocin everyday in order to make sure their daily routine is not disrupted. This would cost a lot of money and if they are ~~are~~ unable to buy oxytocin in time, it might affect them.



A clear 3 marks.

(e) Identify **three** ethical implications of the study described in this report.

(3)

- 1 HF-ASD patients faces difficulty to interact with other as they are unable to understand and respond to signals and that is a social impact.
- 2 Environmental impact:- As it is considered that behaviour of the patient is affected negatively or positively according to their environment, considered by ^(ABA) a
- 3 Economic impact:- As it is mentioned that treatment by hormone oxytocin costs 62 \$ per 5cm³ bottle, which may be not cost effective and needs more money to continue this treatment.



This candidate has somehow interpreted this question as asking for a social, an environmental and an economic implication.

Paper Summary

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

- Read and understand what the question is asking you to do.
- Pay particular attention to command words such as describe and explain.
- Thoroughly review all core practicals. Be clear about all of the details and the skills that each helps to teach you. Question 1 will always be based on one of these practicals.
- Be clear about the different types of variables (IV, DV and control variables).
- Think very carefully about rounding of the answers to calculations and look for 'clues' in the question as to what, if anything, should be done in this respect.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

