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Examiners' Report
January 2013

GCE Biology 6BI08 01

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Introduction

The majority of candidates appeared to be well prepared for the paper and were able to describe core practical's and apply them in the planning of an investigation.

This paper achieved a full range of marks, particularly with question 3.

When candidates recognised the context in which the question was set, they generally found questions 1 and 3 accessible and many good answers were seen. However, a number of candidates are still trying to apply 'generic' answers to parts of these questions. This will often result in little credit. Many candidates continue to score highly with question 2. This is particularly the case for part b and c of the question in which candidates are expected to tabulate and present data provided for them. Those parts of questions where candidates needed to rely on their understanding of biological principles were less well answered. With question 3 some candidates continue to struggle to identify what needs to be included in each section of the question.

Question 1 (a) (b)

Q1(a). The majority of candidates seemed to be familiar with a method of measuring vitamin C in fruit juice. Many candidates produced a good description of how they would investigate the effects of storage on vitamin C levels in a fruit, with a pleasing number achieving full marks.

A number of students were confused about the titration method. Sometimes candidates suggested timing how long it took the DCPIP to decolourise, suggested inappropriate indicators or described incorrect colour changes. For mark point 4 the examiners wanted to see a description of the colour change, simply stating that the DCPIP is decolourised was not sufficient. Few candidates described how the results collected would be used, mark point 6.

Q1(b)(i) Many candidates found it difficult to identify two relevant variables to control. Two, frequently seen suggestions, that did not gain credit were pH and type of fruit. The first is not appropriate to the investigation and the second is given in the stem of the question.

Relatively few candidates gained both of the available marks in Q1(b)(ii).

For the first mark candidates need to suggest how a variable can be controlled. The examiners are looking for sensible suggestions made in the context of the practical. Simply stating 'volume will be controlled using a measuring cylinder' is not sufficient. Candidates need to give a clear indication that the measuring cylinder will be used to measure the same volume for each test or else to measure a sensible stated volume. Using a measuring cylinder for small volumes e.g. $1cm^3$ was not considered appropriate.

For the second mark candidates are required to identify the effect of not controlling the variable on the results. When appropriate, the examiners were looking for a link between the variable being controlled and the dependent variable. A mark was awarded if candidates suggested that a larger volume of juice would decolourise a larger volume of DCPIP. However, no credit was given for less specific statements such as different volumes of juice would decolourise different volumes of DCPIP.

Answer ALL questions.

1 Many fruits contain vitamin C. Fruits can decay quickly when stored at room temperature. They are therefore sometimes stored in a refrigerator or freezer.

(a) Describe an experiment to investigate the effect of storage temperature on the vitamin C content of one type of fruit.

(5)

Independent variable in this experiment is the Strage temperature. It can be 5°c, 10°c, 15°c, 20°c, 25°c. It can be controlled by using thermostatically controlled water bath. Dependent variable is the vitamin C content of fruit juice. It can be measured by titrating the ~~solution~~ juice with DCPIP. & The more juice required to change the colour the less vitamin C it has. burette is used to carry fruit having (vitamin C) and DCPIP in conical flask. Other variables are needed to be constant for example ~~conc~~ concentration of DCPIP. Repeat the experiment 3 times.

When DCPIP changes color from blue black to ~~pink~~ pink the speed of adding vitamin c must be slower down and when it turn's colorless stop adding the juice. In other variables swirlling the flask must be the same.

(b) (i) State **two** variables which need to be controlled in this investigation.

(2)

- DCPIP volume used.
- Time ~~used~~ for which the juice was kept in specific temperature.

(ii) Choose **one** of the variables from (b)(i) above. Suggest how this variable can be controlled. Describe what effect it could have on the results if it is not controlled.

(2)

Variable DCPIP volome

How to control the variable by measuring with pipette.

Effect on the results if the variable is not controlled More juice will be ~~reqw~~ required to decolorise the DCPIP and the ~~volume~~ of vitamin c content would be in accurate. ~~Mean~~ Vitamin c convent reading would decrease.

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Examiner Comments

This response is a typical example of a good description as provided by many candidates. For part (a) the candidate was awarded the maximum of five marks. These marks could have been awarded for mark points 1, 2, 3, 5, 7 and 6. The candidate would not have gained mark point 4 as the colour of DCPIP was incorrectly described as blue-black.

In part (b)(i) the candidate made two sensible suggestions for variables to control and was awarded both available marks.

However, the candidate did not gain any credit for (b)(ii). When describing how to control volume the candidates did not describe how the stated instrument would be used. Measuring the **same volume** each time using a measuring cylinder, or, measuring a stated volume (e.g. 1 cm^3) using a pipette, would gain a mark.

When describing the effect of not controlling the variable the candidate did not relate the change in volume of juice to a change in volume of DCPIP. To gain credit the change in the control variable needs to be clearly linked to a change in the result observed. e.g. a larger volume of juice would be required to decolourise a larger volume of juice.

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Examiner Tip

Make sure you can identify sensible variables to control. If you suggest a variable then you should be able to explain how to control it and what will happen to the result if it is not controlled.

Answer ALL questions.

1 Many fruits contain vitamin C. Fruits can decay quickly when stored at room temperature. They are therefore sometimes stored in a refrigerator or freezer.

(a) Describe an experiment to investigate the effect of storage temperature on the vitamin C content of one type of fruit.

(5)

~~Take a single orange and extract all the juice from it. Pour equal amounts of juice into 5 different~~

Take 6 oranges, and place them in ice baths or thermostatically controlled water baths, ~~each of two~~ of temperatures 0°C, 10°C, 20°C, 30°C, 40°C and 50°C. Ensure that all the 6 oranges are the same species. Store them for two days (48 hours), and then extract all the juice from them. Take a sample of each and titrate them with a 5% solution of DCPIP. Calculate the vitamin C concentration using the mean titre. Repeat the experiment a few times. If necessary, use lower concentration of DCPIP and dilute the juice extracts by dissolving equal amounts of the juices; say 10 cm^3 in 100 cm^3 of water. Use different oranges for the repeats.

(b) (i) State **two** variables which need to be controlled in this investigation.

(2)

Time of storage.

Species / source of oranges.

(ii) Choose **one** of the variables from (b)(i) above. Suggest how this variable can be controlled. Describe what effect it could have on the results if it is not controlled.

(2)

Variable Species / source of oranges.

How to control the variable Ensure that all oranges are from the same plant, or atleast belong to the same plantation / species by checking the labels and buying them from the same store.

Effect on the results if the variable is not controlled Some species of oranges may have more or less juice in them, and therefore a corresponding increase / decrease in the vitamin C content.

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Examiner Comments

The candidate produced a good description of the practical and gained the maximum five marks for part (a), Mark points 1, 2, 3, 5 and 7.

In part (b) two sensible suggestions were made for control variables and both available marks were awarded. Species, variety or type of a named fruit e.g. type of orange was accepted for mark point 2. However, since the candidates were asked to plan an investigation using one type of fruit, suggesting the type of fruit as a control variable was not accepted. It is worth noting that when candidates are asked to give two suggestions the examiners will mark the first two suggestions. So in this response source of oranges would have been ignored.

A sensible suggestion as to how to control the species of orange was made and the candidate was awarded mark point 1. The effect of not controlling the species of orange was reasonably well described and the candidate was awarded mark point 2.

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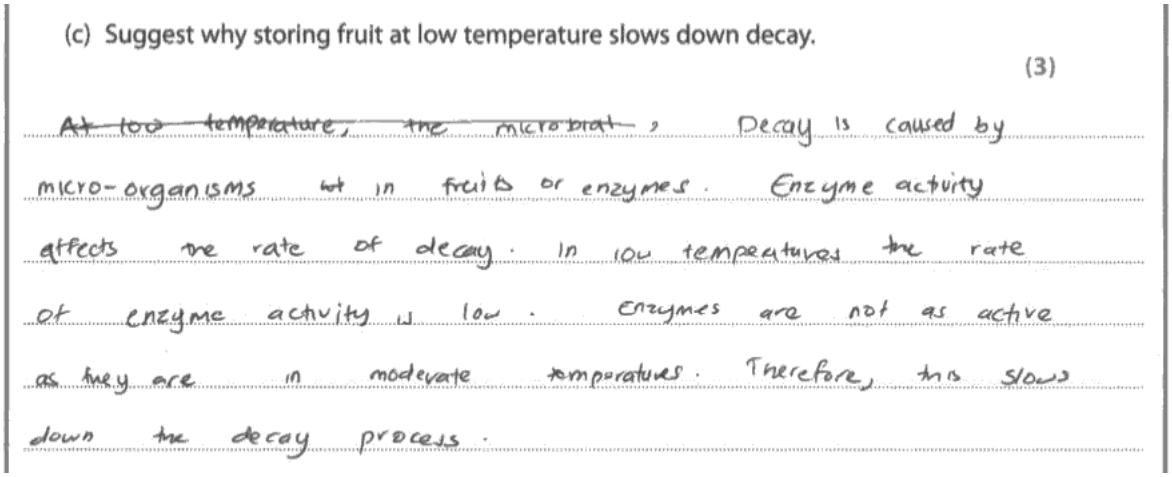
Examiner Tip

When describing the effect of not controlling a variable link the effect to the dependent variable.

Question 1 (c)

The majority of candidates recognised that reduced enzyme activity played a role in reduced decay (mark point 1). Many were also able to provide an explanation for reduced enzyme activity (mark point 3). However, disappointingly few candidates made sensible suggestions about the effect of reduced temperatures on the growth of microorganisms.



(c) Suggest why storing fruit at low temperature slows down decay.

(3)

~~At low temperature, the microbial~~ Decay is caused by micro-organisms ~~wh~~ in fruits or enzymes. Enzyme activity affects the rate of decay. In low temperatures the rate of enzyme activity is low. Enzymes are not as active as they are in moderate temperatures. Therefore, this slows down the decay process.

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Examiner Comments

In this response the candidate has recognised that at low temperatures enzyme activity is reduced and gains mark point 2. The candidate did not go on to explain why enzyme activity is low so did not gain mark point 3. As was the case with many candidates, they did not suggest that low temperature would reduce the growth of microorganisms, so did not gain mark point 1.

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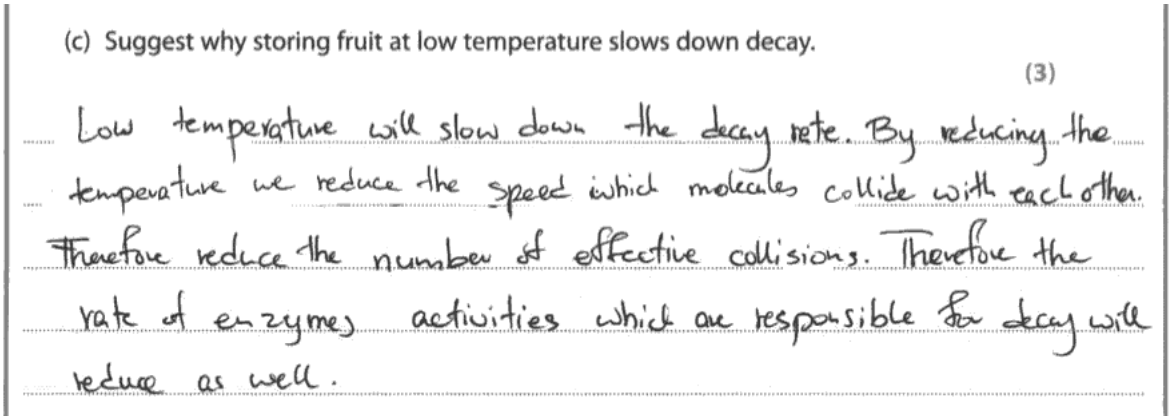
Examiner Tip

When asked to "suggest why" you need to suggest an explanation. e.g. in this question simply stating that microorganisms cause decay is not enough.



(c) Suggest why storing fruit at low temperature slows down decay.

(3)

Low temperature will slow down the decay rate. By reducing the temperature we reduce the speed which molecules collide with each other. Therefore reduce the number of effective collisions. Therefore the rate of enzymes activities which are responsible for decay will reduce as well.

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Examiner Comments

In this response the candidate has suggested that enzyme activity will be reduced and has given an acceptable explanation mark point 2 and 3.

Question 2 (a)

Writing a null hypothesis is an important practical skill and it is disappointing that many candidates cannot write a suitable null hypothesis. Students appear to be unable to recognise when an experiment is testing a difference or a correlation.

Correlation and Coloration

2 A student decided to investigate the effect of listening to music on short-term memory.

She recorded how many numbers were correctly recalled from a grid containing 25 random numbers. She tested 15 members of her class (students **A** to **O**) with no music. She repeated the test three times for each student and calculated the mean for each student.

She repeated the tests with the same 15 students, while they listened to some loud music.

A copy of her mean results for each student is shown below:

No Music:
A 10.3, **B** 9.7, **C** 10.0, **D** 11.7, **E** 11.7, **F** 11.3, **G** 10.7, **H** 10.3, **I** 12.3, **J** 11.3, **K** 10.7, **L** 10.3, **M** 11.3, **N** 11.0, **O** 11.0

With Music:
A 9.0, **B** 10.3, **C** 10.7, **D** 10.3, **E** 9.7, **F** 11.0, **G** 9.3, **H** 10.7, **I** 10.3, **J** 9.7, **K** 10.0, **L** 10.3, **M** 9.7, **N** 11.0, **O** 9.7

(a) Write a suitable null hypothesis for this investigation.

(1)

Ho: There is no significant effect or ~~correlation~~ correlation between listening to music and short-term memory.

ResultsPlus
Examiner Comments

By using the term significant effect or correlation this candidate has tried to provide an answer that covers several possibilities. Responses like this will not gain credit. The candidate must use the correct term to get a mark. In this question, the experiment was designed to test for a difference between two conditions, so the null hypothesis must refer to a significant difference.

ResultsPlus
Examiner Tip

Make sure you know when to use significant difference and significant correlation. You should avoid using the term significant effect.

Question 3

Many candidates produced good answers to this question. In part (a) many candidates recognised that enzymes might be an irritant or cause an allergic response. Some suggested reasonable ethical issues associated with obtaining enzymes from animals. However, many obtained mark point 1 for simply stating there are no significant ethical issues. Those scoring higher marks in parts (b) and (e) related their answers to the specific investigation. Generic statements tended not to provide sufficient detail to gain marks. In part (c) the majority of candidates suggested reasonable investigations. Mark point 1, 2, 3, 4, 5 and 6 were frequently awarded. Many candidates still struggle to decide if a variable should be monitored or controlled. The descriptions of how a variable can be controlled often lacked sufficient detail to allow the award of mark points 7 and 8. Similarly, the description of the need for repeats (mark point 9) was often not sufficiently clear to gain credit. Candidate responses to part (d) suggested a lack of thought about the investigation. Candidates were asked to design an experiment to find the optimum enzyme concentration. This would involve plotting a graph, possibly choosing a narrower range of concentrations to investigate and recognition that at post-optimal concentrations there would be no increase in protein digestion (mark points 4, 5 and 6). Candidates frequently gained mark point 1, 2 and 3. However, the majority then went on to suggest looking for a correlation between enzyme concentration and the extent of protein digestion and this gained no additional credit.

3 A company is in the process of developing a new stain-removing washing liquid. They want to include a protease enzyme to digest the proteins that are responsible for some stains on clothes.

Plan an investigation to discover the optimum concentration of protease to use in this new stain-removing washing liquid.

Your answer should give details under the following headings.

(a) A consideration of whether there are any safety or ethical issues.

(2)

There may be allergic reactions towards the washing liquid.
It is unethical to obtain the enzymes from animals.

(b) Suggestions for preliminary work that you might undertake to ensure your proposed method would provide meaningful data.

(3)

Check and see if proposed method works.
Select a suitable timescale to conduct the experiment.
Determine if there are any other variables that need to be controlled.

(c) A detailed method, including an explanation of how important variables are to be controlled or monitored.

(10)

[Up to 2 marks are available in this section for the quality of written communication.]

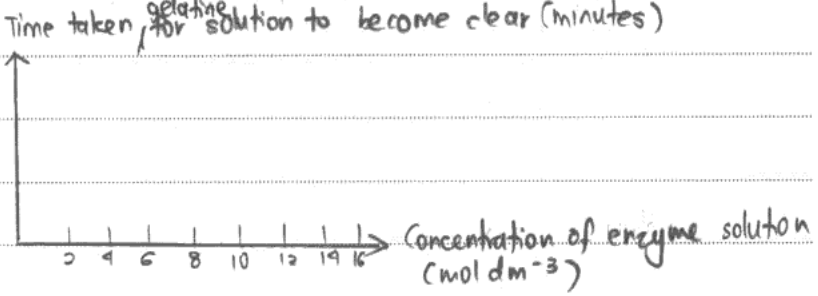
The dependent variable is time taken for the gelatine solution to become clear.
The independent variable is the different concentrations of enzyme used in the stain removing liquid.
Use different concentrations of protease which are of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 mol dm^{-3}.
Using 1 mol dm^{-3} of enzyme solution, pour 15 ml of the enzyme solution into the test tube containing 5 ml of gelatine. Stir the mixture and record the time taken for the gelatine solution to turn colourless using a stopwatch. Fix the volume of enzyme solution used in each experiment at 15 ml.

The variables that need to be controlled here is the temperature of the gelatine solution and the pH level of gelatine solution. Use a water bath to maintain the temperature at a suitable temperature. Use a pH meter to makesure the pH is constant. Repeat the experiment for another 3 times and calculate the mean for each gelatine solution to become clear with different enzyme concentrations

(d) A clear explanation of how your data are to be recorded, presented and analysed in order to draw conclusions from your investigation.

(4)

Concentration of enzyme solution ($mol\,dm^{-3}$)	Time taken for gelatine solution to become clear (minutes)			
	1	2	3	Mean
1				
2				
↓				
15				



Use a student t-test.

If the calculated t value is greater than the critical value at 5% significance level, there is a significant difference. Null hypothesis is rejected.

(e) The limitations of your proposed method.

(3)

There are many other factors that are difficult to control.

Conditions in the experiment may be different from the conditions in the washing process.

Temperature of solution should not be a limiting factor.

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Examiner Comments

In part (a) the candidate gained one mark (mark point 1) for suggesting that there might be an ethical issue with obtaining enzymes from animals. The first sentence did not meet the criteria for mark point 2 or 3. Candidates are asked to design an investigation into the protease enzymes and not washing liquid. Reference to hazards associated with the washing liquid did not gain any credit.

In part (b) the candidate gained one mark (mark point 1). The unqualified statements referring to time scale for the experiment and determining other variables that need controlling, did not gain credit. Candidate must link suggestions to the particular experiment, in this case to stain removal or protease activity.

In part (c) the candidate gained the maximum of 10 marks. These were awarded for mark points 1, 3, 4, 2, 5, 6, 7 and 9 plus 2 marks for QWC.

Mark points 5 and 6 were awarded for controlling the temperature. Mark point 6 was given for identifying the need to control pH. Mark point 8 could not be awarded as using a pH meter to monitor pH is not sufficient. In laboratory based experiments we would expect to see use of a pH buffer. Mark point 6 could also have been given for the for the description of the need to keep the volume of enzyme constant but again no method of control was described so it would not have been possible to give mark point 8.

For part (d) the candidate provided a clear table with headings that matched the proposed investigation and evidence that repeat data would be used to calculate a mean value (mark points 1 and 2). Although the candidate drew the axis for a graph they did not provide any indication of the type of graph to be drawn and the y-axis label did not include the term mean. So mark point 3 was not awarded.

If carried out properly this investigation would not produce a straightforward correlation between concentration of protease and protein digestion. Rather, an optimum concentration of protease would be found, at which point further increases in concentration would have no effect on the digestion. Hence no marks were available for suggesting the use of a statistical test to test for a correlation. Instead, it was hoped that candidates would suggest how the data could be used to identify the optimum concentration of protease.

In part (e) the candidate gained two marks (mark points 1 and 4). Again the reference to temperature being a limiting factor was not sufficiently specific to gain credit. In this case candidates needed to refer to the idea that other limiting factors might affect enzyme activity or stain removal.

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Examiner Tip

When you suggest preliminary work you should make clear the context of your suggestions. e.g. 'Determine the time scale for measuring stain removal' would gain a mark but, 'Determine a time scale for the experiment' is too vague.

(b) Suggestions for preliminary work that you might undertake to ensure your proposed method would provide meaningful data.

(3)

Practise proposed method.

Identify appropriate dependent variable.

Consider all variables that may affect the action of enzymes removing stains.

Check most suitable condition and environment for enzyme protease to act upon.

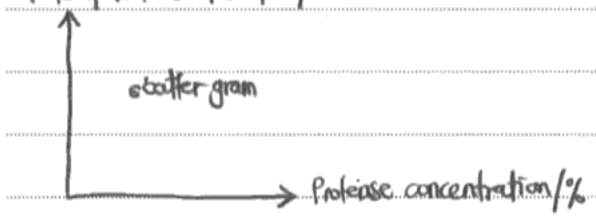
Check suitable time scale to soak cloths in protease.

Check suitable range of protease concentration of 0.1%, 0.2%, 0.5%, 1% and 1.5%.

(d) A clear explanation of how your data are to be recorded, presented and analysed in order to draw conclusions from your investigation.

(4)

Protease Concentration/%	Time Taken for Stain to be Removed/s				Rate of Protease Reaction/s^{-1}
	1	2	3	Mean	
0.1					
0.2					
0.5					
1.0					
1.5					



Use Spearman's Rank Correlation test to determine significant correlation ~~difference~~ between protease concentration and ~~time taken~~ rate of protease reaction.

Compare calculated and critical value.

(e) The limitations of your proposed method.

(3)

Experimental conditions may not represent real conditions when stain-removing liquid is used.

~~Measured in~~ Measuring rate ~~at which~~ of reaction of protease may not correspond with effectiveness of stain-removing liquid.

Difficult to control all variables affecting result.

Difficulty of proposed technique as volume of protein stains on each white cloth is hard to standardise each drop.

Another variable may be acting as a limiting factor for the reaction of protease with protein stains.

The stains may not just be comprised of proteins but other components that cannot be broken down by catalase.

(Total for Question 3 = 22 marks)

TOTAL FOR PAPER = 50 MARKS

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Examiner Comments

This response to 3(b) gained all three available marks (mark points 2, 3 and 4). The first statement would not have gained mark point 1 as it does not say why the method should be practised. Similarly, the second statement is too vague and by itself would not get mark point 6.

For part (d) the candidate produced a clear table with suitable headings and indicated a mean value would be obtained (mark points 1 and 3). The candidate then went on and included a final calculated column for rate of enzyme activity. The candidate suggested presenting the results in a scatter graph (which was accepted although a line graph would have been better). Axis labels matched the table and mark point 3 was awarded.

In part (e) the candidate gained all three available marks (mark points 4, 2 and 3).

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Examiner Tip

Always qualify the suggestions you make in terms of the proposed experiment. So if you are investigating protease activity include that in your suggestions. e.g. identify an appropriate dependent variable to measure protease activity.

Question 2 (b) (c) (d) (e)

The tabulation and graphing skills (b and c) required in this question were relatively straightforward. However, a surprisingly large number of candidates struggled to produce suitable headings for the table. Most were able to calculate the means correctly, although some gave answers to an inappropriate number of decimal places. A significant number of candidates chose difficult scales and as a result made mistakes in plotting the bars and error bars.

Part (d) of the question proved challenging to many candidates. The majority were able to gain mark points 1, and 5 and many gained an additional mark from either mark point 2 or 6. Very few were able to select an appropriate number of degrees of freedom (mark points 3 and 4). Explanations for the results when provided were often confused or inaccurate.

In part (e) candidates frequently gained mark point 1, recognising that other factors may not have been taken into consideration. However, they generally did not go on to elaborate on this (mark points 2 and 3). Many candidates recognised that the sample size was small and gained mark point 4.

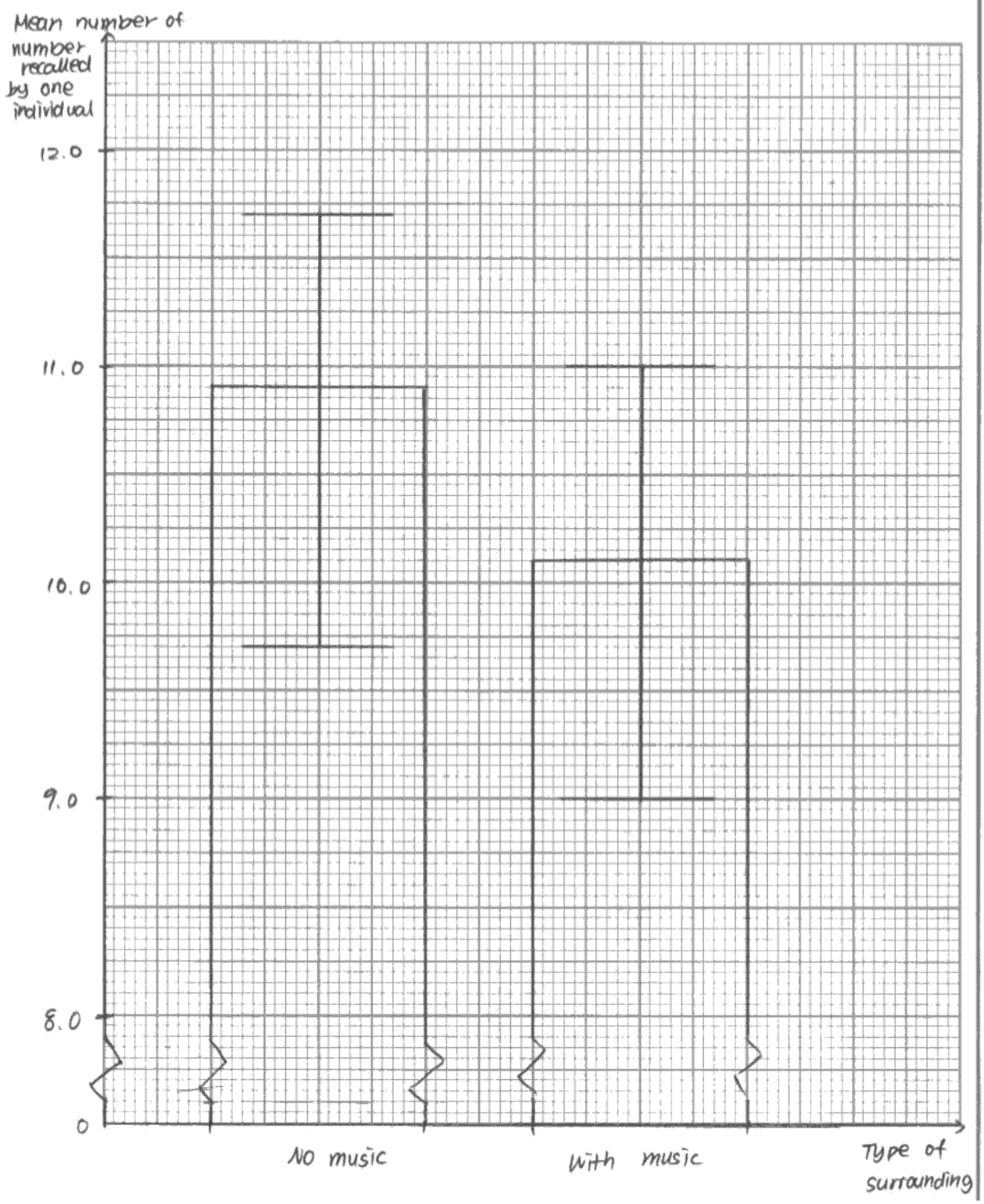
(b) Prepare a suitable table to display the data obtained and calculate the overall mean for the numbers recalled by these 15 students, both with music and with no music.

(4)

Individual	Number of number recalled by individuals	
	No music	With music
A	10.3	9.0
B	9.7	10.3
C	10.0	10.7
D	11.7	10.3
E	11.7	9.7
F	11.3	11.0
G	10.7	9.3
H	10.3	10.7
I	12.3	10.3
J	11.3	9.7
K	10.7	10.0
L	10.3	10.3
M	11.3	9.7
N	11.0	11.0
O	11.0	9.7
Mean	10.9≠	10.1

(c) On the graph paper below, draw a suitable graph to show the effect of listening to music on the overall mean for the numbers recalled by these students. Include on your graph an indication of the variability in the overall means.

(3)



(d) The student applied a *t*-test to explore the significance of her results.

She obtained a result of $t = 3.30$ from her calculation.

The table below shows some critical values for *t*-test calculations.

Degrees of freedom	Significance level (p)	
	0.05	0.01
14	2.14	2.98
15	2.13	2.94
16	2.12	2.92
17	2.11	2.90
18	2.10	2.88
19	2.09	2.86
20	2.09	2.85
21	2.08	2.83
22	2.07	2.82
23	2.07	2.81
24	2.06	2.80
25	2.06	2.80
30	2.04	2.75
∞	1.96	2.58

What conclusion can be drawn from this investigation?

Use the information provided in the table and in the graph you have drawn, together with your knowledge and understanding to **explain** your answer.

(5)

The calculated t value ($t = 3.30$) is greater than critical t value (2.13) at 5% significance level. Therefore, there is an evidence that there is a significant difference in number of number which a person can recall between ~~situation~~ surrounding situation without music and surrounding with music. The person can ~~recall~~ remember more when there is no music. Music may disturbs the memorising as it stimulates ~~nervous system~~ brain. When brain ~~work for~~ process multiple information at the same time, the efficiency for memorising decreases.

(e) Suggest why it may not be reasonable to draw a valid conclusion from the results of this investigation.

(3)

Some students may be used to memorise while listening to music. Also, different person has different response to music. Besides, In ~~the~~ this investigation, ~~there is~~ ~~the~~ effect from practice cannot be removed and the range bars of each group overlaps with great extent. ~~The highe~~

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Examiner Comments

In the response to part (b) the candidate has produced a suitable table with all the raw data and with correctly calculated means. The heading 'number of numbers recalled by individuals' was considered sufficient for mark point 4. The majority of candidates struggled to produce a suitable heading for the table.

The candidate scored one mark for the graph, mark point P. The graph contains all the elements of a good graph however, an error in plotting the first range bar and a poor y-axis label prevent the award of mark points A and B. The expected graph was simple, two bars with range bars and as a consequence marking was strict with many candidates losing marks for mistakes such as those illustrated in this example.

This was a fairly typical response for part (d) with the candidate gaining three marks, mark points 1, 5 and 7.

No marks were awarded for part (e).

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Examiner Tip

When presenting data take care with table headings and axis labels on graphs. Headings and labels must be accurate. When you plot a graph using tabulated data, the axis labels should correspond to the headings used in the data table.

(b) Prepare a suitable table to display the data obtained and calculate the overall mean for the numbers recalled by these 15 students, both with music and with no music.

(4)

student	Mean number of numbers correctly recalled	
	No music	With music
A	10.3	9.0
B	9.7	10.3
C	10.0	10.7
D	11.7	10.3
E	11.7	9.7
F	11.3	11.0
G	10.7	9.3
H	10.3	10.7
I	12.3	10.3
J	11.3	9.7
K	10.7	10.0
L	10.3	10.3
M	11.3	9.7
N	11.0	11.0
O	11.0	9.7
Overall mean	10.9	10.1

(d) The student applied a *t*-test to explore the significance of her results.

She obtained a result of $t = 3.30$ from her calculation.

The table below shows some critical values for *t*-test calculations.

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19	2.09	2.86
20	2.09	2.85
21	2.08	2.83
22	2.07	2.82
23	2.07	2.81
24	2.06	2.80
25	2.06	2.80
30	2.04	2.75
∞	1.96	2.58

What conclusion can be drawn from this investigation?

Use the information provided in the table and in the graph you have drawn, together with your knowledge and understanding to **explain** your answer.

(5)

Null hypothesis is rejected. The calculated value (3.30) is greater than the critical value (2.04) at 5% significance level at 30 degrees of freedom. There is a significant difference in short-term memory between students who listen to music and those who do not. The short-term memory of students who do not listen to music is significantly greater than students who listen to music.

(e) Suggest why it may not be reasonable to draw a valid conclusion from the results of this investigation.

(3)

Too little number of students are involved in the experiment.

short-term memory of students may differ individually.

Gender of students is not fixed.

there are many other factors that are not controlled.

ResultsPlus
Examiner Comments

For part (b) the candidate produced a good example of a table with accurate headings and accurate means, gaining all four marks.

In part (d) the candidate has made a reasonable attempt at providing a conclusion and an explanation of their answer gaining mark points 2, 1, 5 and 6. For mark point 5 candidates must refer to a significant difference, as that is what was tested.

For part (e) the candidate gained two marks, mark points 4 and 1.

ResultsPlus
Examiner Tip

When describing the conclusions that can be drawn from statistical data you should generally refer to the null hypothesis and do not forget to describe what the results show.

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

- Candidates should make sure they understand the underlying biological principles being explored as well as the practical techniques employed.
- When planning their answers to questions candidates should ensure they understand the context in which the question is set and must apply their answers to this context. It is particularly important to bear this in mind when using mark schemes with previous papers in preparing for this exam.

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

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