

GCE

General Studies

Unit **F732**: The Scientific Domain

Advanced Subsidiary GCE

Mark Scheme for June 2014

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

Annotation		Meaning of annotation	
			Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
1		A0	0 marks for A04
2		A1	1 mark for A04
3		A2	2 marks for A04
4		A3	3 marks for A04
5		Cross	Incorrect
6		DEV	Development
7		EG	Example / reference
8		EVAL	Evaluation
9		J	Justify
10		NAQ	Not answered question
11		MR	Method
12		R	Report
13		REP	Repetition
14		Tick	Correct point

Subject-specific Marking Instructions**Assessment Objectives**

There are four assessment objectives:

AO1 Demonstrate Knowledge and Understanding applied to a range of issues, using skills from different disciplines:

- showing an understanding of the subject being examined by including accurate factual information
- including information from a range of sources, from different subject areas
- displaying confidence and clarity in the presentation of facts.

AO2 Analysis and Evaluation by marshalling evidence and drawing conclusions; select, interpret, evaluate and integrate information, data concepts and opinions:

- developing and supporting ideas with additional information that enhances and clarifies their meaning
- introducing examples that are selected to support the knowledge being presented
- discussing the validity of ideas through analysis and evaluation.

AO3 Understanding Knowledge by demonstrating an understanding of different types of knowledge, appreciating their strengths and limitations:

- extending the range of knowledge beyond that which is commonly accepted
- considering alternative, and perhaps, less popular, attractive or plausible viewpoints and offering a different perspective
- including personal experience that might support or refute the knowledge and ideas that are being presented.

AO4 Communication in a clear and accurate way while being concise, logical and relevant:

- writing with fluency and accuracy taking account for the technical rules of language
- producing a response that engages the reader and transmits its meaning without ambiguity
- using a range of relevant language and terminology that is appropriate to the topic.

Note that in Section A of this paper, marks for communication are allocated and awarded separately. The following table should be used in the allocation of marks. Further information is included with individual questions

Where a response has gained '0' marks for content, then AO4 will be A0

The mark for AO4 cannot exceed the content mark

Where there are **three marks** for Communication, use the following descriptors and annotate with A3, A2, A1 or A0

3 marks	A very clear response making a case with facility, using a range of appropriate expression and without technical errors
2 marks	Most of the response is clear though some aspects may remain unclear due to technical errors that hinder understanding.
1 mark	The response is unclear and it is difficult to follow the sense of the argument(s) presented. There are many technical errors.
0 marks	This is awarded for no response or when the answer is totally incorrect.

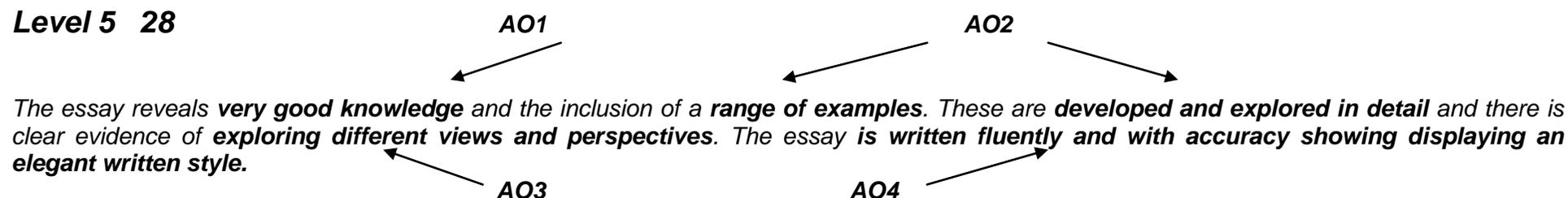
Guidance for Examiners

Stages in marking an essay

- read and **fully annotate** the candidate's response using the question specific annotations found above. Annotation should be placed **in the margin**
- **review** your annotation, and then consider in which **level** the answer is located.
- consider its **position within the level** and **allocate a mark**.

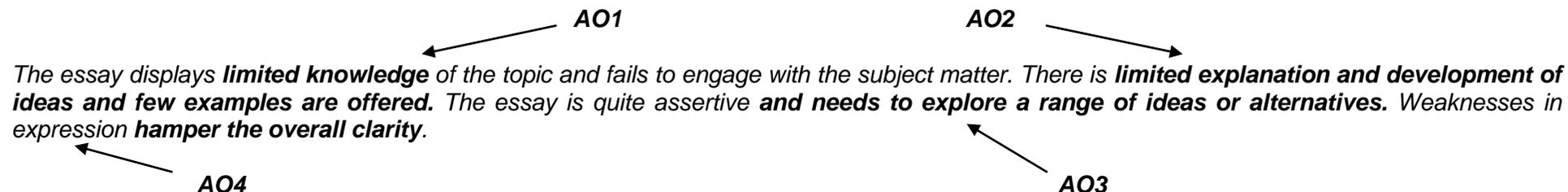
Write a full summative comment to support the marking decision.

The comment must address the main requirements of the question and reveal how well the candidate has tackled these, for example an answer placed in the highest level might receive a comment such as :

Level 5 28

- Comments must be made **in addition** to the **AO statements** but **NOT** instead of them.
- Comments should always be **positive and specific** and they must **match the mark and level** which is being awarded
- Comments must be considered **after close reference to the level descriptor** for each individual question.

A weaker answer might receive a comment such as:

Level 2 10**Summary**

All summative comments must include:

- some reference to the extent and quality of the candidate's knowledge (**AO1**)
- an acknowledgement of how far the knowledge is understood, developed and interpreted with the use of examples (**AO2**)
- how far there has been an examination of different viewpoints and perspectives that challenge the question or knowledge (**AO3**)
- a judgement of the quality and clarity of the essay (**AO4**).

Question			Answer	Marks	Guidance
1	(a)	(i)	<p>3.21</p> <p>For example 3.2, 3.208 or any other answer not correctly rounded off.</p>	[2]	<p>Annotation Each mark should be annotated with a \surd up to a maximum of 2 marks Award 2 marks for the correct answer given to 2 d.p</p> <p>Award 1 mark for an answer which has not been correctly rounded off or only the substitution is shown: $\begin{array}{r} 2 \times 85 \\ \underline{\quad} \\ 53 \end{array}$</p>
		(ii)	<p>48 times</p> <p>$n = \frac{170 \times 2}{3.142 \times 2.25} = 48.0939$ (using 3.142)</p> <p>or 48.08 (using 22/7)</p> <p>If only 48.0939 or 48.08 are seen, and not rounded off, then award 3 marks (2 marks for correct substitution and 1 mark for calculation).</p> <p>For example: $n = \frac{170 \times 2}{3.142 \times 2}$ (2 correct substitutions)</p>	[4]	<p>Annotation Each mark should be annotated with a \surd up to a maximum of 4 marks Award 4 marks for the correct whole number of times</p> <p>Breakdown of the 4 marks available: 1 mark for correct substitution of $L = 2$ 1 mark for the substitution of $D = 2.25$ (ignore π)</p> <p>1 mark for correct answer of 48.08/48.0939 1 mark for correct whole no of times</p> <p>Award 3 marks for correct substitutions leading to a value that has not been rounded off</p> <p>Incorrect answers: Please check the substitution on incorrect answers as it may be worth 1 or 2 marks If there is an error in the substitution: 1 mark for correct substitution of 2 of these values.</p>

Question	Answer	Marks	Guidance
	<p>But D has been incorrectly substituted as 2 So this would be awarded 1 mark and no further credit would be available.</p>		
(b)	<p>Only credit the first 2 trends offered by the candidate. The candidate is required to describe two trends, which may include:</p> <p>Overall trends:</p> <ul style="list-style-type: none"> • that the more times the needles is dropped the closer the results get to 3.14 (π) • that all attempts/lines show the same zigzag type of fluctuation, larger at the beginning and smaller towards the end • that there is a greater difference between the graphs in the attempts at the beginning, where there are 10 throws, and very little difference later when there are more throws. • The value found for π is high at the beginning where there are very few throws and decreases as more throws are included <p>Trends specific to a particular set:</p> <ul style="list-style-type: none"> • Sets 1 and 2– the value of pi increases as the no of throws increases until it reaches approx 3.14 so do not credit these points twice • Set 3 – the value of pi decreases till it reaches 3.14 <p>If a candidate simply lists several points with no development then award a max of 2 for the content. The mark for AO4 will then be A1 or A2 as the question is asking for a description.</p>	[7]	<p>Annotation Each mark should be annotated with a \surd up to a max of 4 marks. 4 marks + 3 AO4 marks.</p> <p>Allocate 1 mark for a simple statement for example ‘The results get closer to 3.14 or π’ or ‘They all have a zigzag pattern’.</p> <p>Allocate 2 marks for each developed point for example ‘As more throws are made the results get closer to 3.14 or π’ Allocate 2 marks for comments regarding ‘the results get closer to the value for pi’ followed by a few readings from the graph. Allocate 1 mark only if the data simply refers to the value of pi Allocate 0 marks if the candidate refers to correlation or just negative and positive gradient.</p> <p>Candidates may refer to the zigzag ‘form’ of the fluctuation and the ‘differences’ as their two separate trends but each must have its own development.</p> <p>For example: ‘The graphs are further apart at the beginning and closer at the end (worth 1 mark) as they all follow the same type of pattern where there are more throws (vague development)’ then only 1 developed point may be given credit. Where there are three marks for Communication, use the following descriptors:</p>

Question	Answer	Marks	Guidance			
			<p>If the response simply includes a description of the numbers reached on the graph then this will gain '0' marks so AO4 will also be 0 marks</p>		<p>A3</p>	<p>A very clear response making a case with facility, using a range of appropriate expression and without technical errors</p>
	<p>A2</p> <p>Most of the response is clear though some aspects may remain unclear due to technical errors that hinder understanding.</p>					
	<p>A1</p> <p>The response is unclear and it is difficult to follow the sense of the argument(s) presented. There are many technical errors.</p>					
	<p>A0</p> <p>This is awarded for no response or when the answer is totally incorrect.</p>					
<p>Where there are AO4 marks available the mark awarded for AO4 must not exceed the mark for content.</p>						

Question	Answer	Marks	Guidance
(c)	<p>The response should include about 3 points, if only 2 points are offered then they must both be very well developed to gain 6 marks</p> <p>Examples may include:</p> <ul style="list-style-type: none"> • that the computer will generate more drops of the needle than a person could in a shorter time • that the computer experiment will avoid human error, for example the height the needle is dropped from • that the computer program could be used to simulate other heights of drops of the needle which a person could not do • that the recording of the information will be more accurate because it can count the drops more efficiently • that the computer results could be analysed more quickly when it reaches the higher numbers of throws <p>If a candidate simply lists several points with no development then award a max of 3 for the content. The mark for AO4 will then be A1 or A2 as the question is asking for an explanation.</p> <p>Do not credit comments about the presentation of the report, for example bar charts, scatter diagrams, histograms etc</p>	[9]	<p>Annotation Each mark should be annotated with a \surd up to a max of 6 marks 6 marks + 3 AO4 marks</p> <p>Allocate 1 mark for a simple statement.</p> <p>For example: 'The computer generates a lot of drops' or 'The computer could be quicker/more accurate'</p> <p>Allocate 2 marks for each developed point up to a maximum of 6 marks</p> <p>For example: 'The computer can generate a much higher number of drops than a person could and this will be completed in a shorter length of time' or 'The recording of the data will be much more accurate as technology is more efficient at recording than a person'</p>

Question	Answer	Marks	Guidance								
	<p>Do not credit 'more accurate' as that appears in the question.</p> <p>Credit may be given if the word 'precise' is used</p>		<p>Where there are three marks for Communication, use the following descriptors:</p> <table border="1"> <tbody> <tr> <td>A3</td> <td>A very clear response making a case with facility, using a range of appropriate expression and without technical errors</td> </tr> <tr> <td>A2</td> <td>Most of the response is clear though some aspects may remain unclear due to technical errors that hinder understanding.</td> </tr> <tr> <td>A1</td> <td>The response is unclear and it is difficult to follow the sense of the argument(s) presented. There are many technical errors.</td> </tr> <tr> <td>A0</td> <td>This is awarded for no response or when the answer is totally incorrect.</td> </tr> </tbody> </table> <p>Where there are AO4 marks available the mark awarded for AO4 must not exceed the mark for content.</p>	A3	A very clear response making a case with facility, using a range of appropriate expression and without technical errors	A2	Most of the response is clear though some aspects may remain unclear due to technical errors that hinder understanding.	A1	The response is unclear and it is difficult to follow the sense of the argument(s) presented. There are many technical errors.	A0	This is awarded for no response or when the answer is totally incorrect.
A3	A very clear response making a case with facility, using a range of appropriate expression and without technical errors										
A2	Most of the response is clear though some aspects may remain unclear due to technical errors that hinder understanding.										
A1	The response is unclear and it is difficult to follow the sense of the argument(s) presented. There are many technical errors.										
A0	This is awarded for no response or when the answer is totally incorrect.										

Question	Answer	Marks	Guidance
2 (a)	<p>Monthly payment is £53.13</p> <p>If £637.50 or £637.5 only seen, award 2 marks as candidate must have worked out the percentage correctly to get this figure.</p> <p>8.5/100 x 7500 1 mark</p> <p>Or</p> <p>8.5/100 x (<i>incorrect difference</i>) 1 mark (this shows understanding of working out a %)</p> <p>Correct answer = £637.50 1 mark</p> <p>Monthly payment = 637.50/12 = 53.125 1 mark</p> <p>= £53.13 1 mark</p> <p>If a candidate uses an incorrect difference they will have been allocated 1 mark if they have shown the ability to start to work out the %. They can only gain a further 1 mark if they show they understand that they need to divide by 12 to get the monthly payment.</p> <p>For example using an incorrect difference of 7000</p> <p>8.5/100 x '7000' 1 mark</p>	[4]	<p>Annotation Each mark should be annotated with a \surd up to a max of 4 marks</p> <p>Award 4 marks for the correct answer <u>only</u> seen</p> <p>Breakdown of the 4 marks available: 1 mark for attempting to calculate 8.5% of 'their' difference</p> <p>1 mark for answer of £637.50</p> <p>1 mark for correct method to find the monthly payment (ie division by 12)</p> <p>1 mark for 2dp on correct monthly payment</p> <p>Max of 2 marks if incorrect difference (1 mark each for attempted % and monthly payment).</p>

Question	Answer	Marks	Guidance
	<p>=£ 595 0 marks</p> <p>£595/12 = £49.58333333/£49.58 1 mark</p> <p>This allows the candidate some credit for the % calc and the monthly payment</p> <p>A candidate may calculate the payments by dividing the difference by 12 and then finding 8.5% of it.</p> <p>ie: 7500/12 = 625</p> <p>Followed by a % calculation of 8.5% of 625 = £53.13</p>		
(b)	<p>36 handshakes</p> <p>$8+7+6+5+4+3+2+1+0 = 36$</p> <p>For example:</p> <p>9 people – 8 handshakes 8 people – 7 handshakes</p> <p>7 people – 6 handshakes 6 people – 5 handshakes</p> <p>5 people – 4 handshakes 4 people – 3 handshakes</p> <p>3 people – 2 handshakes 2 people – 1 handshake</p>	[4]	<p>Annotation</p> <p>Each mark should be annotated with a \surd up to a max of 4 marks</p> <p>Award 4 marks for the correct answer of ‘36’ only seen</p> <p>Candidates may offer a table, diagram or list as their working out. Award 3 marks if a clear, correct and organised table, diagram or list is shown without a final answer. Only do this if you can count the 36 ways, but the answer is not shown.</p> <p>Award 2 marks for an attempt to complete some working out if it follows a logical pattern for example a 9 x 9 grid or simple table where it is clear that the candidate has eliminated some possibilities.</p> <p>Award 1 mark if only a 9 x 9 grid or simple table is seen without any form of elimination</p> <p>Award 1 mark if there is a statement saying that each of the 9 lecturers only have 8 handshakes to complete for example</p> <p>9 – 1 = 8 handshakes</p>

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