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General Certificate of Education (A-level)
June 2012

Critical Thinking CRIT3

(Specification 2770)

Unit 3: Beliefs, Claims and Arguments

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Unit 3 Beliefs, Claims and Arguments

Section A

<table>
<tr><th>No.</th><th>Question AO:</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td colspan="2">Section A Beliefs and Claims</td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>What conclusion can be drawn from the last sentence of paragraph 1 together with the first sentence of paragraph 2?
(2 marks)

That beauty does not lie in the eye of the beholder. OR that there is or must be some objective standard. (Accept suitable paraphrasing) [2]

For vague or imprecise articulations eg responses which summarise the reasoning without making it sufficiently clear what conclusion can be drawn, or that draw a conclusion which does not fully follow [1]</td><td>2</td><td></td><td></td></tr>
<tr><td>2</td><td>What hypothesis is the thought experiment in paragraph 2 intended to support, and how successful is it?
(8 marks)

<table><tr><td>Good

(7–8)</td><td>Clearly articulated expression of the hypothesis and a well-developed, appropriately weighted evaluation of the supporting claims, evidence, and / or reasoning.</td></tr><tr><td>Intermediate

(4–6)</td><td>Candidates correctly identify the hypothesis / show clear evidence that they understand the hypothesis and the way in which it is supported, with some relevant evaluative comment on the support.</td></tr><tr><td>Basic

(1–3)</td><td>Candidates correctly identify the hypothesis but critical comment is wayward; OR: offer some relevant comment on the hypothesis and supporting claims or arguments.</td></tr></table>
The hypothesis is that beauty is objective, not purely a matter of opinion or taste: that some people simply are more attractive than others. The thought experiment invites the reader to predict what the result of two repeat votes would be when the result of the first vote in each case is known. The fact that the result in each case can be confidently predicted is a strong case for the view that individual taste is not the</td><td>2</td><td>4</td><td>2</td></tr>
</table>

No.	Question AO:	1	2	3
	deciding factor. However (for a top band or more) the candidate should note that there may be other explanations besides the purely objective, such as fashion, peer-group influence, etc which do not leave individuals entirely free to make their own judgements. Also, the fact that a lot of people agree with the judgement does not make the judgement objective.			

No.	Question AO:	1	2	3
3	**At the start of paragraph 3 of Document A, the author considers the hypothesis that the concept of beauty is a result of different cultural influences. Is this hypothesis seriously undermined by the rest of the paragraph?** ***(6 marks)***		**6**	

Good (5–6)	Well developed, appropriately weighted evaluation of the challenge made by the claims, counter claims, arguments on the hypothesis.
Intermediate (3–4)	Some critical but under-developed evaluation of the effect of the claims on the hypothesis.
Basic (1–2)	Some relevant critical comment on the hypothesis and counter-claims.

Yes, it would be undermined if the claims are true – though some of them are a little hard to take seriously. If people from entirely different cultures, age groups and even species can be shown to have some agreement as to what is beautiful, then clearly the theory that beauty is determined by the influence of local communities is dented. However: none of the examples properly tackle the possibility that the concept of beauty can change 'over time'. Although people of different ages are asked, they are still people from the same age (ie epoch). Credit can be given for other plausible attempts to rebut the inference made in the paragraph, for instance by saying that with modern communications we all get used to seeing the same faces world-wide, and there is thus a global community concurring in what is beautiful – human or animal! The explanation of the baby example could be that the baby picks up the feelings of liking or disliking a face from other adults around, and is influenced by them.

NOTE: Candidates who understand the basic logical structure of the paragraph, ie that it presents a target thesis that it goes on to rebut, yet without any critical comment can get [1] maximum.

No.	Question AO:	1	2	3
4	**150 years ago a German physicist and psychologist. Gustav Fechner, performed the following experiment. Subjects were each shown ten rectangles of varying proportions and asked to select the one they found most pleasing to look at. 76% chose rectangles with height-length ratios between 1:1.50 and 1:1.75, with a peak at 1:1.62 (1:φ)** **Critically assess this data as support for the hypothesis that beauty is linked to the Golden Ratio.** **(4 marks)**		**2**	**2**
	Superficially this is quite supportive evidence in that three quarters of the sample group found that rectangles which approximate the Golden Ratio most attractive, with the Golden Rectangle as the mode. [1] If the ratio was correct, this would be the sort of result we would expect to see. Therefore it <u>is</u> confirming data consistent with the hypothesis. However, without knowing what the rectangles were the data is fairly meaningless. Suppose, for instance, that there were 7 rectangles with ratio between 1:1.75 and 1:1.5 that would account for 70% choosing those rectangles at random. Also, we do not know how extreme the outlying ratios were: the range may be from square to very long and thin. Thus the result could be explained by people preferring the most average looking shapes, which need have nothing to do with φ. The peak at 1: φ is a little harder to explain away, but it could be that the rectangle with that ratio was placed at the median point. How the rectangles were arranged visually could also be questioned. Nor do we know the size of the sample and number of repeats etc. These and other 'fair-test' issues can be credited. However, <u>if</u> the rectangles were carefully / 'fairly' chosen, as a genuine test of the theory the evidence becomes stronger and does indeed give some genuine support. Indeed, candidates might want to argue that, given certain favourable assumptions, this is fairly strong confirming evidence in that it is the sort of results we WOULD expect to find were the theory true. Another weakness of the data is that it is only about rectangles; there is no support for a general conclusion about beauty in other objects: faces, natural scenery, buildings etc. NB No credit for saying that the responses are subjective / opinion (since opinions are the data sought). Award as follows: For basic critical points with some (potential) relevance [1] For further development / precision / insightfulness + [1–3]			

<table>
<tr><th>No.</th><th>Question AO:</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td>5</td><td>
In Document A, paragraph 11 states:

“All in all, there is so much confirming evidence for the Golden Ratio theory of beauty that it has to be taken seriously.”

Based on the material in paragraphs 7–10, do you agree?
(6 marks)
<table>
<tr><td>Good

(5–6)</td><td>Well developed, appropriately weighted assessment of the justification given for the claim, demonstrating sound understanding of requisite methodology.</td></tr>
<tr><td>Intermediate

(3–4)</td><td>Some appropriate assessment of the justification for the claim, showing some familiarity with the methodology.</td></tr>
<tr><td>Basic
(1–2)</td><td>Some relevant comment on the claim and reasoning given for it.</td></tr>
</table>
For a good mark on this question there must be some understanding shown of the nature of evidence for a hypothesis in terms of confirming instances. (See Spec. 3.3.4). If the GR theory is to be taken seriously one would naturally infer that many things which people agree upon as beautiful would exhibit approximately the φ: 1 proportions; and / or that artists etc who aim to create beautiful things employ the ratio in their works. If this expectation is borne out many times that would count as support for the theory. For the conclusion to be well justified, it would have to be the case that the GR appeared in a significantly greater proportion of objects deemed to be beautiful than did other different measurements – tall and thin, or closer to a square, for example.

Paragraphs 7–10 claim a number of confirming instances. Of these, paragraphs 7 and 8 seem to have the most direct link to beauty, with the link in paragraphs 9 and 10 more tangential. Candidates could discuss the relevance of paragraphs 9 and 10, detailing the kind of assumptions required, and assessing if they are warranted. The confirming instances in paragraphs 7 and 8 are more directly linked, eg that the outline of the Parthenon and the Mona Lisa face fit inside a golden rectangle; and that some of the other internal measurements, such as the apex of the roof to the top of the pillars (or base of the lintel) and the height of the pillars, are in the golden ratio. But the truth is that there are many features which *could* be chosen that are not in the golden ratio to each other. The obvious problem is they are selective in two ways: (1) The examples themselves are the ones in which the ratio can be seen with no mention of others. (2) In the chosen examples the
</td><td>2</td><td>2</td><td>2</td></tr>
</table>

No.	Question AO:	1	2	3
	dimensions that are chosen are just the ones that fit the ratio. You could draw any number of rectangles on parts of the Parthenon frontage that are nowhere near being *golden* rectangles. These are ignored. This could be put down to selective sampling / confirmation bias (or words to that effect). The everyday objects in paragraph 8 and the natural one in Paragraph 10 are also selectively chosen. Why is a credit a card claimed to be more pleasing than a pen? Wouldn't a pen look ugly if it had the proportion of the GR? Maybe things look pleasing that are the right size for their function. (This is a line that could be taken.) One point that might be made is to question whether the Parthenon and / or Mona Lisa really are as beautiful as they are assumed to be – or have we just been told so often that they are beautiful that we accept it? Something could be made of this. The same goes for the shell and the galaxy. Indeed, in Paragraph 10 we are told that these are awe-inspiring, intricate etc which are arguably question-begging in the context. More positively it could be argued that the main and most salient features *do* fit golden rectangle or exhibit the golden ratio, and that the yellow lines really do show why the proportions of the two works are so pleasing / satisfying / attractive to look at. However, a good response would be difficult to envisage that gave unqualified support to the hypothesis.			

<table>
<tr><th>No.</th><th>Question AO:</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td colspan="2">Questions 6 – 7 relate to Document B.</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>Based on the dialogue, how plausible is Jackie Stedall's claim that the architects of the Parthenon may <u>not</u> have had the Golden Ratio 'in mind'?
(6 marks)

<table>
<tr><td>Good

(5–6)</td><td>Correct and clearly expressed assessment of the plausibility of the claim, together with relevant and convincing reasons to support the assessment.</td></tr>
<tr><td>Intermediate

(3–4)</td><td>Some appropriate assessment of the justification for the claim, with one or more reasons that are likely to be sketchy or under-developed.</td></tr>
<tr><td>Basic
(1–2)</td><td>Some relevant comment on the plausibility or acceptability of the claim.</td></tr>
</table>

Candidates need to consider the plausibility and / or significance of the claims Stedall gives in support of her judgement. Stedall has two reasons for doubts about the plausibility of the claim. The first is that people 'see the ratio too often', implying that it need not always be there as an intentional property. The second is that the builders could have chosen proportions that just happened to approximate the golden ratio. A third reason could be that she accepts that the builders follow an instinct, which could be understood as different from having something 'in mind'. On the other hand, this could be classed as a contradiction on Stedall's part: instincts are in the mind – arguably.

Candidates are likely to judge that the claim is at the very least plausible. They could corroborate her ideas, eg by giving alternative explanations for the shape's (alleged) resemblance to the GR proportions (ie without it necessitating that the builders had it in mind.) There is certainly a reasonable case for saying that the builders need not literally have measured out the height and width etc in line with the numbers 1 and φ, though if it happened by chance it seems quite a coincidence. It could be noted that the ancient Greek mathematicians knew about φ, (See Document 1. paragraph 7), though that does not mean that the architects knew about it too. Another reason for defending the plausibility is that it is very easy to find examples of the ratio in objects that have many different features – for example, the very prominent rectangle formed by the base and the height of the lintel has different proportions: the theory is very selective in its choice of evidence.</td><td>3</td><td>3</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th>Question AO:</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td colspan="2">Section B</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Re-read paragraph 8 of Document A.</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>“All manner of merchandise and packaging approximates closely to the proportions of the golden rectangle: credit cards, cameras, laptop-computers; many books, posters, picture frames.... If it is true that these proportions are pleasing to look at, that would be a good reason for designing them accordingly. If two very similar products are on display side-by-side, and the only difference between them is their shape, which is the consumer more likely to choose? Clearly the one that is visually more attractive.”

(a) This may be understood as an argument to the best explanation. If it is, what is its implicit conclusion?
(2 marks)

That the proportions of the golden rectangle are pleasing to look at. [2]

The Golden Ration is the reason behind the shape of many things made [1]</td><td>2</td><td></td><td></td></tr>
<tr><td></td><td>(b) Suggest one counter-argument that could be made against the author’s reasoning.
(4 marks)

The fact that X is a plausible explanation for Y does not mean that it is the causal explanation, ie that the makers of these objects had that reason for designing them that way. There may be practical reasons: eg credit cards are a convenient shape and size for wallets; computer screens are easy to read; etc. These may explain customer choice. Also, all manner of other merchandise has different proportions and it sells too. Hence there must be a different explanation for their shape and size.
<table>
<tr><td>Good
(4)</td><td>For a clearly relevant, succinct and effective counter-argument.</td></tr>
<tr><td>Intermediate

(2–3)</td><td>For a relevant line of counter-argument with at least ONE further level of development / support.</td></tr>
<tr><td>Basic

(1)</td><td>A counter-argument is presented but its relevance is unclear and / or fails to develop beyond a single assertion.</td></tr>
</table></td><td></td><td></td><td>4</td></tr>
</table>

<table>
<tr><th>No.</th><th>Question AO:</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td>8</td><td>
Read the following argument

“Okay, so the ratio of 1 to phi is the same as the ratio of phi to 1 plus phi, and so on until infinity; and no other number has that property. Right? I’ll admit the mathematical fact is fascinating. But I’m not saying, ‘wow, isn’t that beautiful’, because in the end a number is just a number, and numbers are abstract things that humans have invented. Beauty is in physical things that you can see and touch and find in the real world around you. And anyway, how is 1.618 more beautiful than 1.619, or 1.719, or 1.8 or 25, or – you see what I’m saying? When does the length of some line, or shape of some rectangle, stop being beautiful and start being ugly? Tell me that.”

Critically evaluate the above objection to the mathematical theory of beauty.
(8 marks)
<table>
<tr><td>Good

(7–9)</td><td>For two or more relevant, perceptive, and thoroughly developed critical comments supporting or challenging the argument, and used to support an evaluative judgement about the argument as a whole. The response will demonstrate a clear understanding of the target argument.</td></tr>
<tr><td>Intermediate

(4–6)</td><td>For two or more relevant but perhaps partially explained points relating to the effectiveness or otherwise of the argument, and / or warrant for the claims. The response will demonstrate a broad understanding of the target argument.</td></tr>
<tr><td>Basic

(1–3)</td><td>For some relevant evaluative judgement related to the strength or weakness of the argument with some basic (usually under-developed) attempt at explanation or justification.</td></tr>
</table>
</td><td>3</td><td>5</td><td></td></tr>
</table>

No.	Question AO:	1	2	3
	The text can be construed as an argument for the implied conclusion that a number per se is not beautiful, expressed as: 'I'm not saying, wow...etc.' Two strands of reasoning are given and both need to considered: (1) A number is abstract / invented, whereas beauty is in the physical world / natural. (There is an obvious and dubious assumption here that the abstract or invented cannot be beautiful. There is also arguably a false dichotomy here in that beauty may be in both the natural and the abstract / invented.) Counter examples could be given, eg of musical harmony, rhythm of poetry etc. (2) Is an old and strongly fallacious argument that because one cannot draw a line between what is eg beautiful and ugly one therefore cannot say that something is either one or the other. (Sorites paradox: some candidates may know it, but are not required to.) There is a fairly obvious defence here in that something can approximate to the ratio sufficiently to be pleasing without having to do so exactly. Candidates may detect an element of straw man – or at least irrelevance – in the objection. The theory is not so much that the number *itself* is beautiful; but that shapes that make use of its proportions are so (the shapes themselves being actual and physical.)			

<table>
<tr><th>No.</th><th>Question AO:</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td colspan="2">Question 9 relates to Document C</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td>Assess the argument presented in Document C based on Dr Marquardt's research and accompanying images. Are the author's claims and inferences convincing, or are there grounds for scepticism?
(9 marks)
<table>
<tr><td>Good

(7–9)</td><td>For two or more relevant, perceptive, and thoroughly developed critical comments supporting or challenging the argument, and used to support an evaluative judgement about the argument as a whole. The response will demonstrate a clear understanding of the target argument.</td></tr>
<tr><td>Intermediate

(4–6)</td><td>For two or more relevant but perhaps partially explained points relating to the effectiveness or otherwise of the argument, and / or warrant for the claims. The response will demonstrate a broad understanding of the target argument.</td></tr>
<tr><td>Basic

(1–3)</td><td>For some relevant evaluative judgement related to the strength or weakness of the argument with some basic (usually under-developed) attempt at explanation or justification.</td></tr>
</table>
By any standards this is deeply flawed piece of reasoning, and certainly it is bad science, so that if it is intended as an argument it is a very poor one. For example, the following could be included among grounds for scepticism:

It makes a blatant appeal to alleged scientific expertise, or to authority.
The 'research' that led to Marquardt's so-called discovery is not cited: we are merely told that the mask he developed 'closely coincides with faces that people find beautiful'.
The mask bears little obvious connection with the golden ratio.
The pictorial evidence is selective in two ways: presumably there are faces that might be called beautiful but do not fit the mask; and faces which may be called plain that do fit the mask. If so, these have not been selected. (Confirmation bias.)
Finally there is room to suspect that there may be vested interest at work, given M's day job as a facial surgeon, and the tell-tale fact that he has 'patented' the mask.
</td><td>4</td><td>5</td><td></td></tr>
</table>

No.	Question AO:	1	2	3
	For all these reasons it would be untenable to evaluate this as a good argument. A positive appraisal would be hard to defend, but candidates might mention: • M's medical qualifications and years of research as lending some authority / expertise; • the theory of phi generally and its independent status as a theory of beauty; or even more generally the plausibility of a link between beauty and shape / symmetry. (Note however that this line of defence involves going beyond the actual evidence presented in the argument) • the evidence of the pictures: there do seem to be some norms of beauty spanning time and other variables, and the mask appears to map onto the common features. (This is dubious, but can receive some credit, if not too naively accepted.)			

No.	Question AO:	1	2	3
10	**'People today confuse beauty with youth, glamour and celebrity. Real beauty is none of these.'** **With reference to the above photograph and quotation, state your view of what real beauty is, accompanied by a short supporting argument.** **(Note that the photograph does not appear in the mark scheme due to third party copyright.)** **(Note that you may choose to defend one of the views expressed in the documents or offer an alternative hypothesis of your own.)** ***(15 marks)*** Candidates are to be awarded according to the strength, clarity and cogency of their argumentation. There is no need to express the conclusion as a discrete claim; as long as it is clear exactly what the position is that is being advanced. Marks will be awarded for an argument with recognisable structure, clear conclusion and relevant supporting reasons. Suitable lines of argument may include: Application of the documents, principally the GR theory of beauty. If 'real' beauty *can* be described mathematically, then this has presumably nothing or very little to do with eg glamour, youth or celebrity (unless of course people become celebrities because of their beautiful proportions that happen to follow the GR – this kind of qualification ought to be considered.) Alternatively, candidates could develop the thesis that beauty is subjective / culturally relative – perhaps by identifying fashions / trends that are popular in one time or place but seen as absurd in another. Candidates that do so need to draw out the implications for the second part of the citation and to present a coherent line: either this means that there is no such thing as 'real' beauty, and that it is therefore impossible to define in any meaningful sense; or admit that 'real' beauty is a concept that is necessarily fluid, and any judgement they come to is the product of the time and place they are coming from. Candidates could explore the link between beauty and appearance; either arguing that 'real' beauty is something other than appearance / is something inner; or arguing that appearances are important but agree that they do not have to correspond to eg youth, glamour and celebrity.			**15**

No.	Question AO:	1	2	3
	Candidates could put forward a naturalistic / evolutionary account of beauty – that that which is beautiful is explicable in terms of evolutionary theory. (By way of qualification, candidates could recognise that this may work for eg human beauty but is harder to apply to eg poetry / music) While a personal response is invited, candidates have to be careful not to generalise out from their own case. The fact that they do not agree that beauty is eg about youth or glamour or celebrity does not mean that *in general* this does not accurately describe people's views today. Also, candidates need to be careful not to juxtapose a range of different viewpoints which contradict each other / are inconsistent – without some clear attempt to resolve these and find a clear place to stand			

Generic mark-grid for Section B:

	Award level		
CRITERION:	***Thoroughly met, well structured and clearly expressed***	***Partially met with adequate expression and structure***	***Inadequately met.*** ***Basic response with some weaknesses of expression / structure***
A position – or positions – are advanced that are relevant to the question and consistent with candidate's reasoning.	3	1 – 2	0
Strong supporting reasons: 2 or more, or 1 thoroughly developed	5 – 6	3 – 4	1– 2
Supplements to reasoning (1 or more of): *example; analogy; evidence; explanation; principle; reasoning; anticipating and responding to objections*	5 – 6	3 – 4	1– 2

- NB Candidates are not rewarded for exhibiting additional knowledge per se, but for the use they put it to in their reasoning if they choose to introduce it. Conversely, there is no penalty for not exhibiting additional knowledge: use of the documents alone is sufficient for awarding full credit (5 – 6).

Distribution of marks across the questions and assessment objectives for Unit 3

AO Balance	**AO1**	**AO2**	**AO3**
Total Section A	**09**	**17**	**06**
Total Section B	**09**	**10**	**19**
Paper Total: [70] Marks	**18**	**27**	**25**
Paper Total: [70] Percentage	**26%**	**39%**	**36%**

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