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General Certificate of Education (A-level)
June 2011

Critical Thinking CRIT2

(Specification 2770)

Unit 2: Information, Inference and Explanation.

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.

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Critical Thinking Mark Scheme

INTRODUCTION

The nationally agreed assessment objectives in the QCA Subject Criteria for Critical Thinking are:

AO1 Analyse critically the use of different kinds of reasoning in a wide range of contexts.

AO2 Evaluate critically the use of different kinds of reasoning in a wide range of contexts.

AO3 Develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner.

- Marks are allocated to the assessment objectives according to the nature of each question and what it is intended to test.
- For Section A, Examiners need only provide a total mark for each of the candidates' answers. They do not need to provide a breakdown by Assessment Objective.
- For Section B, marks should be awarded according to the generic marking grid.
- Candidates should be able to achieve the highest marks with a selection of relevant points, not necessarily the complete range.
- **Indicative content is provided as a guide for examiners. It is not intended to be exhaustive and other valid points must be credited.**

Unit 2 Information, Inference, Explanation

Section A

No.	Question AO:	1	2	3
Questions 1 and 2 refer to Document A				
1	**In paragraph 2, it is stated that 'it is predicted that the top ten in-demand jobs for 2015 may not even have existed in 2010'.** **What does the author infer from the statement?** **(*1 mark*)** The author infers that teachers are preparing today's students for jobs that do not even exist yet. (Accept accurate paraphrases).	**1**		
2	**This question refers to paragraph 3**			
2(a)	**Explain why the shift from 'Made in China' to 'Designed in China' will affect the postgraduate population.** **(*3 marks*)** Award up to 3 marks according to accuracy and development of any legitimate explanation. Do not penalise candidates who confuse postgraduate and graduate. For example: • Greater skill [1]. Designing products takes greater (academic) skill than manufacturing them [2]. • Postgraduate education develops advanced (academic) skills [+1]. • The shift would affect postgraduate education, not work based training, because it is expensive and difficult for employers to train the workforce [+1].	**2**	**1**	

No.	Question AO:	1	2	3
2(b)	**In paragraph 3 of Document A, the author claims that countries such as China, South Korea and India 'will increasingly compete with us for highly skilled work'.** **Identify <u>one</u> significant implicit assumption on which this claim relies.** **(*2 marks*)** Award up to 2 marks according to accuracy and / or development of any significant implicit assumption identified. For example: • China, South Korea and India will have (highly skilled) workers [2]. • Assumes that there is a finite supply of (highly skilled) work / jobs to compete for [2]. **Or:** • Trend continues [1]. Assumes / predicts that recent trends / changes in Asia will continue or accelerate [2] and not be upset by climate change, recession, revolution, war, etc [+1].	**1**	**1**	
Questions 3 and 4 refer to Document B				
3	**Explain whether or not the following statements may be safely inferred from Table 1 in Document B.**			
3(a)	**In total, the UK invested less money in R&D, higher education and IT software than Australia in 2002.** **(*2 marks*)** Candidates must *explain why* the inference is **unsafe** to gain marks. Award up to 2 marks according to accuracy and development of any legitimate explanation. For example: The statement may not be safely inferred because: • UK may invest more money than Australia [1]. While it invests a smaller proportion of its GDP, the UK's GDP could be larger than Australia's GDP and therefore be a larger amount in absolute terms [+1].	**1**	**1**	

No.	Question AO:	1	2	3
3(b)	**In 2002, the average Swede was more likely to have a university education than the average Greek.** **(*3 marks*)** Candidates must *explain why* the inference is **unsafe** to gain marks. Award up to 3 marks according to accuracy and development of any legitimate explanation. For example: The inference is unsafe because: • The term 'average' is ambiguous between mode, median or mean [1]. • Although Sweden has higher Knowledge Investment (than Greece)… [1]. – E.g. Sweden could fund only research [+1] but Greece could fund a large number of undergraduates [+1]. – E.g. The size of population (or wealth and distribution of spending) must be taken into account [+1] but there is no information given to indicate it [+1]. • Candidates may note that the Greek figure refers to 2001 but Sweden 2002 [1].	1	2	

No.	Question AO:	1	2	3
3(c)	**If the rate of growth in knowledge investment between 1994 and 2002 remains the same for all countries as shown in the table, Britain will fall into the Low Investment group of economies by 2018.** **(*3 marks*)**	1	2	
	Candidates must *explain why* the inference is **safe** or **unsafe** to gain marks. Award up to 3 marks according to accuracy and development of any legitimate explanation (in writing or mathematically). For example: This is a safe inference because: • UK will reach 4.1% [1] of GDP in 2018 (3.7 + (0.2 x 2) = 4.1) [+1] • While Spain, for example, will reach 4.2% [+1] of GDP (2.8 + (0.7 x 2) = 4.2) [+1] • No middle investment economy is growing more slowly than UK [+1]. Only middle economy ranked below UK, Austria, growing more quickly than UK and / or will overtake UK by 2018 [+1]. Accept mathematical demonstrations that calculate the *percentage increase* from 1994–2002 and apply it to 2002–2010 and 2010–2018 (rather than using the % point change as above). E.g. For the UK: ((0.2 / 3.5 x 100) x (3.7 / 100)) + 3.7 = 3.91 [((3.91 – 3.7) / 3.7) x 100 x (3.91 / 100) + 3.91] = 4.13 The inference may be unsafe because: • There are no clear criteria given [1] for what is a Low Investment economy [+1], such as being in the bottom six countries OR below 3% Knowledge investment [+1].			

No.	Question AO:	1	2	3
4	**Look carefully at Table 1 and the graph, Figure 1, in Document B.** **What, if anything, can we conclude from them about the relationship between investment in the knowledge economy and success in the international competition for wealth and jobs?** **(*4 marks*)**		**4**	
	Award up to 4 marks in total for: a) Clear judgement(s) about what can be concluded [1 per supported / plausible judgement]; b) Support for judgement(s) through reasoning and reference to Table 1 and Figure 1 [1–3 for support of each judgement according to accuracy and development]. Candidates may receive full marks for addressing only wealth or jobs. For example: What we can conclude is limited [1] because: • GNI per capita is a measure of wealth but does not give any information directly about jobs [+1] although high employment could help to explain high GNI per capita [+1] since employed people tend to add to a country's total income [+1]. It is **not necessary** to be a high knowledge investment economy [nor to grow knowledge investment] to be wealthy [1] because: • Irish GNI per capita equalled Germany's in 2002 [+1] but Germany is a middle rank investor, while Ireland is low rank [+1]. • Irish GNI per capita growth between 1994 and 2002 was faster than Sweden's [+1], yet Ireland's knowledge investment shrank 0.2% while Sweden's grew 1.7% [+1] and Sweden is the highest ranked investor, while Ireland is low rank [+1]. It is **not sufficient** to be a high knowledge investment economy to be wealthy [1] because: • Despite South Korea being ranked fourth in knowledge investment and investment growth of 1% [+1], GNI per capita is below Germany's (middle ranked) and Ireland's (low ranked) [+1]. • Ireland's GNI per capita grew more quickly than Korea's [+1] and Ireland is low ranked but Korea is high ranked [+1].			

No.	Question AO:	1	2	3
	• Candidates could argue that to suggest a link between knowledge investment and GNI would be to commit the cause-correlation fallacy [1], when both could be due to other sectors growing quickly (e.g. banking) [+1]. • Credit candidates who criticise the question's premise that there is a competition at all [1] because growing economies provide markets and jobs for other countries [+1].			
Questions 5 to 7 refer to Document C.				
5(a)	**Identify the main comparison in Document C.** **(*2 marks*)** Award up to 2 marks according to the accuracy and development of the comparison identified. Identifying who / what is being compared [1]. E.g. Asians vs. other ethnicities [1]. Identifying the respect in which things are compared [1]. E.g. Work ethic [1]. Identifying <u>both</u> who / what is being compared <u>and</u> in what respect [2]. E.g. • Asian work ethic and British work ethic [2]. • Asian students' success and non-Asian students' success [2]. • Attitude of British and non-British workers [2]. Document C contains Table 2 and Figure 2. Credit may be given for any *reasonable* comparison between them. E.g.: The *main* comparison is between: • GCSE results and working hours [1]. • GCSE results in 2008 by ethnicity and annual hours worked per worker across (seventeen) different countries, in 2002 [2].	**2**		

No.	Question AO:	1	2	3
5(b)	**Briefly explain whether or not the comparison is appropriate.** **(*2 marks*)**		**2**	

Candidates must *explain why* the comparison they identified in question 5(a) is appropriate or not, to gain marks. Award up to 2 marks according to the accuracy and development of any legitimate explanation.

Read the candidate's answer to 5(a) before marking this answer.

For example:

The work ethic comparison is appropriate because:

- It is plausible that hard work / work ethic explains academic and economic success [2].

The comparison of Asians inappropriate because:

- E.g. There may be important differences between Asian students in Britain and Asian workers in Asia [2].

  E.g. Asian *immigrants* may have particular attitudes to hard work (perhaps to work hard to earn money to send to support families abroad) not shared by Asians in Asia [2].

Or

Candidates may be credited for evaluating Steinberg's study in terms of credibility or how representative it is (due to data or methods). E.g. The study was written in 1996, while the Home Office and employer comments were reported in 2007, casting doubt on the comparison if Steinberg's results are no longer applicable [2].

Give one mark for partial or basic explanations of appropriateness.

No.	Question AO:	1	2	3
6(a)	**Steinberg's study included ethnically Chinese pupils in the Asian category, as well as the other Asian sub-groups listed in Table 2.** **Using the information from Table 2, what percentage of Asian students achieved 5 A*– C GCSEs in 2008 according to Steinberg's definition of Asian? Show your reasoning.** **(*3 marks*)**	**3**		
	Award up to 2 marks for the percentage of Asian students achieving 5 A*–C GCSEs in 2008. Award up to 1 additional mark for any legitimate reasoning. The average of all Asian plus Chinese students scoring 5 A*– C GCSEs including English and Maths is 51.6% [2]. (Accept 51 – 52% [1]). Correct workings [+1]: $\frac{(2{,}229 \times 0.695) + (40{,}043 \times 0.506)}{(2{,}229 + 40{,}043)}$ i.e. $\frac{21{,}811}{42{,}272} = 0.516$ Accept rounded figures for correct workings, e.g.: 22 000 / 42 000			

No.	Question AO:	1	2	3
6(b)	**Document C claims that 'The superior performance of the Asian students is stark'. Including Chinese pupils as Asians, to what extent is that claim supported by Table 2?** **(*3 marks*)** Award up to 3 marks according to the accuracy and development of one or more points which help to establish the extent of support for the claim, e.g. by reference to the data in Table 2. Candidates must concentrate on the extent of support for the superior performance being stark. Examples which undermine the claim: • 'Stark' is a subjective judgement [1] and this limits our ability to assess to what extent it is supported [+1]. • Steinberg's study took place over ten years but Table 2 only shows one year's provisional data [1] so it would only confirm Steinberg's findings a little [+1]. • Treating Asian Pupils as one group hides considerable differences in performance among sub-groups [1] with an example [+1]. • The claim is wrong vis-à-vis the White Irish [1] and an exaggeration given the % difference with All pupils [+1]. • All Asian and Chinese vs Any Passes are close, not starkly different [1]. E.g. All Asian is 98.6% vs 98.2% for All Pupils [+1]. Examples which demonstrate support for the claim: N.B. Candidates should not be credited for noting that Asian students outperform others if it is based on a mis-calculation of the Asian students' performance (e.g. 60.5%). • The All Asian and / or Chinese group do perform better OR 51.6% A*–C is better than the All Pupils category [1] and / or All White Pupils category [1]. • If 'Asian' referred to only Indian and / or Chinese students, the claim would be very well supported [1] because the % difference with many other groups is greater [+1].	**2**	**1**	

No.	Question AO:	1	2	3
6(c)	**In paragraph 2 Steinberg explains the superior performance of Asian students by their working harder than other students.** **Briefly evaluate the reasoning in paragraph 2.** **(*3 marks*)**	**1**	**2**	
	Award up to 3 marks according to the accuracy and development of any legitimate evaluation of the reasoning. • Reasoning is strong because working harder, trying harder and being interested in achievement are *plausible explanations* of academic success [1] as this fits most people's experience of school work [1]. • The author assumes that 'superior intelligence' means the same as 'genetically superior' (by using the Steinberg quote) [1] but this is questionable because genetics could cause greater performance in other ways than intelligence [+1]. E.g. Improved work ethic or better memory [+1]. • Limiting the options / false dichotomy [1] – **either** success comes from *genetically* superior intelligence **or** it comes from working hard [+1]. However, success could come from other factors such as parental support [+1]. • Cause-correlation fallacy [1] – twice as much time on homework each week may correlate with outperforming other students [+2], but both could be due to enjoying and being interested in school work, not the cause and effect [+1]. • Steinberg assumes that genetic superiority would decrease homework time [1], but this assumption is questionable because non-genetic factors could override the lack of a need to work long hours [+1] such as social / cultural values [+1]. One mark for naming a flaw correctly. 2–3 marks for explaining it in context. Do not penalise a candidate who names a flaw incorrectly but explains how the reasoning is flawed well.			

No.	Question AO:	1	2	3
7	**In light of the bar chart, Figure 2, briefly assess the claim that 'UK staff work the longest hours in Europe' (*Personnel Today*).** **(*2 marks*)** Award up to 2 marks according to the accuracy and development of any legitimate evaluation of the claim. The claim is wrong because: • At least one EU country (e.g. Finland, Hungary, Spain and the Czech Republic) has longer annual hours per worker [1]. It isn't possible to tell if the claim is right or wrong because: • It could be true if data includes part-timers [1]. If part-time staff in Britain bring down the annual hours *per worker* nevertheless full-time UK workers could still work longer hours than their counterparts in other European countries [+1]. • Figure 2 is limited to 2002 working hours but the question does not specify a time [1] and working hours change according to the economic conditions and legislation [+1]. • The question does not specify how 'longest hours' is to be measured [1]. UK staff could work the longest hours per day, but work fewer days per year [+1].	1	1	
Question 8 refers to Document D				
8(a)	**Quote an example of persuasive language from Document D.** **(*1 mark*)** Award 1 mark for any quotation of persuasive language. For example: • "Goodbye creativity, imagination, life." • "unspeakably awful new gadget" • "terrible crime of exploiting the name of a delicious fruit" • "it allows slave labour to further invade our everyday lives." • "cast off your manacles, submit no more to the machine – stop working and start living!" There is no need to explain the use to gain the mark. Do not accept, for example: • "we are now working longer hours than medieval peasants". • "machines make us look bad".	1		

No.	Question AO:	1	2	3
8(b)	**Assess the quality of the argument of Document D in the light of Figure 3.** **(*6 marks*)**		**6**	

Marks **Answer Type**

1 – **2** : Basic assessment with one or more relevant points

3 – **4**: Adequately developed assessment with one or more relevant points supported by some explanation and / or examples.

5 – **6**: Well developed assessment with one or more focused points supported by clear explanation and / or examples.

To achieve 3+ marks, an answer must refer to Figure 3.

Possible strengths of the argument:

- Persuasive language shakes us out of complacent assumptions
- Working longer does make goals / virtues such as creativity, imagination and good social / emotional life harder to achieve
- Efficiency of technology does increase pressure on employees to increase productivity / be 'more like machines'
- Mobile communications technology does make it more difficult to create barriers between work and home life
- Figure 3 trend for longer hours over 60 years consistent with claim that machines mean long hours / 'instruments of enslavement'.

Possible weaknesses of the argument:

- Straw men: E.g. 'Technology has long promised a utopia' misrepresents claims of technology advocates OR 'the employer does all he can to make people more like machines' misrepresents staff development in many organisations
- Limiting the options: E.g. The conclusion implies working / submitting to the machine vs. living / freedom which ignores role of technology in freeing us from uncreative tasks
- Over-generalisation: Examples of Blackberry, working on beach, receiving instructions in pub do not justify claim of enslavement
- Equivocation: 'Submit no more to the machine' equivocates between technology and the economic system
- Cause-correlation fallacy: Figure 3 longer hours trend may correlate with faster invention of technology, but does not show cause
- Figure 3 shows great variation in working hours but technology was invented 'faster and faster', which is not explained
- Questionable assumptions: People are working in the private sector for profit; life away from work would be better; technology does not liberate creativity.

Section B (See Generic mark-grid on pages 18 & 19)

No.	Question AO:	1	2	3
9	**'We should aim to lose the great global competition for jobs. If we win it, we get wealth but we will be slaves to the false promises of machines and money; if we lose, we might rediscover freedom, creativity and imagination.'** **Write a reasoned argument for or against the passage above.** **In presenting your case you should:** • **produce a structured argument with a clearly stated conclusion or conclusions** • **draw on relevant information and evidence found in the source documents; you may also draw on your own knowledge and experience if relevant** • **consider any general principles that may apply** • **consider and respond to possible counter-arguments.** **(*30 marks*)** Please remember to confirm on CMI+ (Marking Software) that you have access to the candidate's FULL answer. If the candidate indicates they have continued on a separate sheet you should refer the answer to a Senior Examiner. Answers should be marked according to Assessment Objective 3 – the ability to develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner. Use the assessment grid below to help you to do so. Acceptable answers include those which conclude: • that the passage is – entirely right – entirely wrong – right but only to an extent – defensible under one interpretation but not another – defensible given one or more assumptions • that it is impossible to tell if it is correct or not Take care to credit nuanced, detailed or complex arguments and conclusions, distinguishing them from those that are unclear or confused.			**30**

No.	Question AO:	1	2	3
	Possible relevant principles: • the right to material / economic well-being or employment • people or countries should be equal • that we should maximise e.g. national / global wealth OR happiness • that hard work (or creativity) is what deserves to be rewarded • that any number of things are more valuable than wealth or work (e.g. freedom, autonomy, creativity). Possible lines of argument against the passage: • The statement presents a false dichotomy – freedom, creativity and imagination are compatible with economic success. • The statement wrongly assumes that the economy is a competition to be won or lost. History shows (Figure 1) that competition has led to increased wealth for all, even if hours are low (Figure 2). • The statement is based on a romantic and false view of poverty and unemployment to suggest that they are an opportunity to rediscover creativity and freedom. It is a dangerous attitude which encourages complacency. Britain may not always be wealthy. Possible lines of argument for the passage: • We are all in a race to the bottom – trying to provide the workers who will work longest for the least, to the benefit of the employer. The USA is richest (Figure 1) but has very long hours (Figure 2). • What we produce through working long hours (e.g. hi-tech mobile phones) are not of much value compared to what we lose through such long hours (family life, freedom to develop talents). • Competitive, wealthy, high employment economies are not sustainable. They produce more through longer hours and consume more per person. Consequently, they put the environment at risk.			

Generic mark-grid for Section B:

Criteria	Award level		
	Level 3: Good response	**Level 2: Reasonable response**	**Level 1: Basic response**
Conclusion	4	2 – 3	1
	A conclusion is clearly stated that is supported by all the reasoning, and directly responds to the question.	A conclusion is clearly stated that is supported by most of the reasoning, and responds to the question.	A conclusion is stated that is supported by some reasoning, and responds to the question in part.
Reasoning	9 –12	5 – 8	1– 4
	The conclusion is strongly supported with reasons, contributory arguments, examples, clarification of terms, etc. which are precise and detailed.	The conclusion is supported with reasons, contributory arguments, examples, clarification of terms, etc.	The conclusion is weakly supported with reasons, contributory arguments, examples, clarification of terms, etc. which may be imprecise.
Use of information From Source Documents and/or to other relevant information or experience.*	5 – 6	3 – 4	1– 2
	Information (*must* include Source Documents) supports reasoning strongly. Information is interpreted carefully and inferences drawn from it are evaluated in detail.	Information supports reasoning. Information is interpreted and inferences drawn may not be evaluated.	Information supports reasoning weakly. Information is not interpreted. Inferences drawn may be implicit and are not evaluated.
Reference to principle	4	2 – 3	1
	One or more general principles are introduced and play a significant role in the argument. Justification of the principle may be given.	One or more general principles are introduced and play a role in the argument.	One general principle is introduced and plays a minor or unclear role in the argument.
Counter-argument	4	2 – 3	1
	One or more challenges and objections are anticipated and answered effectively.	One or more challenges and objections are anticipated and answered.	One or more challenges and objections is anticipated and partially answered.

	Good response	Reasonable response	Basic response
QWC **Quality of Written Communication**	Consistently communicates clearly and appropriately	Generally communicates clearly and appropriately	Communication may impede understanding.

* 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 Level 3 'Good response' (5-6).

Distribution of marks across the questions and assessment objectives for Unit 2

AO Balance	AO1	AO2	AO3
Total Section A	**17**	**23**	–
Total Section B	–	–	**30**
Paper Total: [70] Marks	**17**	**23**	**30**
Paper Total: [70] Percentage	**24%**	**33%**	**43%**

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