National
Qualifications
2015

2015 Computing Science

New Higher

Finalised Marking Instructions

General Marking Principles for Higher Computing Science

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this paper. These principles must be read in conjunction with the detailed marking instructions, which identify the key features required in candidate responses.

(a) Marks for each candidate response must always be assigned in line with these General Marking Principles and the Detailed Marking Instructions for this assessment.

(b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.

(c) If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader.

(d) Marks should be awarded regardless of spelling as long as the meaning is unambiguous.

(e) Candidates may answer programming questions in any appropriate programming language or pseudocode. Marks should be awarded, regardless of minor syntax errors, as long as the intention of the coding is clear.

(f) Where a question asks the candidate to **describe**, the candidate must provide a statement or structure of characteristics and/or features. This should be more than an outline or a list. It may refer to, for instance, a concept, process, experiment, situation or facts in the context of, and appropriate to, the question. The candidates will normally be required to make the same number of factual/appropriate points as are awarded in the question.

(g) Where a question asks the candidate to **explain**, marks should only be awarded where the candidate goes beyond a description, for example by giving a reason, or relating cause to effect, or providing a relationship between two aspects. These will be related to the context of the question or a specific area within a question.

Detailed Marking Instructions for each question

Section 1

Question			Expected Answer(s)	Max Mark	Additional Guidance
1.			1000 1000- using 8 bit 2's complement method OR 1111 1000- using sign bit method	**1**	1 mark for correct binary answer.

Question			Expected Answer(s)	Max Mark	Additional Guidance
2.	(a)		Many to many	**1**	Accept M:N or M:M
	(b)		One to one	**1**	Accept 1:1

Question			Expected Answer(s)	Max Mark	Additional Guidance
3.			Jimmy 0 Jimmy 3 1 mark for Jimmy output twice Or 1 mark for Jimmy 0 Or 1 mark for Jimmy 3 2 marks for full correct answer	**2**	If Jimmy is stated twice and the index values are incorrect award 1 mark only.

Question			Expected Answer(s)	Max Mark	Additional Guidance
4.			Feature • Rule • Uses capital letter to identify variables to allow for instantiation Benefits • Adds information/meaning based on other facts/rules • Reduces need for repetition of facts/rules or improves efficiency by reducing code • Facilitates queries • Use of variables allow values to be returned • Any other valid Any 2 bullet – 1 mark each	**2**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
5.			• (Provide facilities) for public authorities (eg police/MI5/ government) to intercept electronic communications • fit equipment to facilitate surveillance (technical services) • pay for systems to assist with interception of electronic communications • pay for the hardware needed to store electronic communication • inform staff of the fact that access to communication data is subject to the RIPA. **1 mark** for each bullet, maximum 2 marks	**2**	Examples should focus on electronic communication rather than generic terms such as 'data' and 'files'.

Question			Expected Answer(s)	Max Mark	Additional Guidance
6.	(a)		• Date • Time • Script attached to interface item	**1**	
	(b)		• Recommended items • Name	**1**	Answers referring to the 'search bar' are not valid but answers referencing 'search results' should be accepted in line with bullet 1.

Question			Expected Answer(s)	Max Mark	Additional Guidance
7.			1 mark for correct simple condition found = true/counter = 49 2 marks for correct complex condition found = true OR counter = 49	**2**	Accept end of list/accept index of 50 eg OR end of list This question is not assessing indexing from zero.

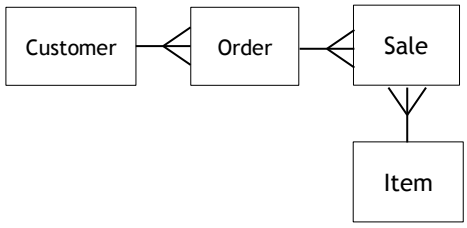
Question			Expected Answer(s)	Max Mark	Additional Guidance
8.			• Allows the client to see/test/ feedback on proposed solutions • Subsystems/specific elements can be prioritised and tested as early as possible • A range of proposed solutions can be developed on a small scale instead of the need for full implementation	2	Any two bullets for a maximum of two marks.

Question			Expected Answer(s)	Max Mark	Additional Guidance
9.			• Frequently accessed data/ instructions are held in cache • Faster access memory (on the same chip as processor) • Reducing the need to access slower main memory	2	Any two bullets for a maximum of two marks. Do not accept 'physically closer/ close to the processor'.

Question			Expected Answer(s)	Max Mark	Additional Guidance
10.			• End user group/independent test group (1 mark) • Given tasks to perform/observed performing tasks (1 mark) • To provide feedback/evaluate (ease of use/fit for purpose) (1 mark) Any two bullets for two marks	2	It would also be correct to say the independent group were observed carrying out the set tasks and evaluated on ease of use/fit for purpose. Do not accept client, must convey independence of testers/users from a client. Accept techniques in relation bullet point two (eg Eyetracking).

Question			Expected Answer(s)	Max Mark	Additional Guidance
11.			A primary key with more than one field (or attribute or column)	1	Primary/unique must be stated. Award no marks for 'more than one key' unless the candidate references foreign keys.

Section 2

Question			Expected Answer(s)	Max Mark	Additional Guidance
12.	(a)		Order no, Item ID	**1**	Both required
	(b)			**3**	• Customer to Order + Item to Sale + Order to Sale all related and no others • Two of above three are the correct 1:M • All three above are the correct 1:M **1 mark** for each bullet Many representations are possible. Accept 1:M, 1:N, 1:∞ and crow's feet.
	(c)		Customer.Customer name Customer.Customer address Item.Description Item.Cost Order.Order no (or Sale.Order no) Order.Date Sale.Quantity [Order no]=10728	**3**	• Award one mark for all four tables (Customer, Item, Order, Sale) • Award one for six or seven correct fields • Award one mark for criteria of [order no] = 10728. Cannot attain the mark awarded for bullet point two if two or more fields that should not be included are stated in an answer. Do not penalise for additional search criteria eg customer name. Allow tables and fields to be expressed separately.
	(d)		SUM([Sale.Quantity]*[Item.Cost]) and is placed in the Report Footer	**3**	• Use of SUM or clear description • Quantity*Item cost used or clear description • Report Footer or Summary field **1 mark** for each bullet

Question			Expected Answer(s)	Max Mark	Additional Guidance
13.	(a)		• Specific processes/instructions/ tasks can be allocated to certain processors/core processors (1 mark) • Allowing concurrent/ simultaneous execution (of scripts and different media elements). (1 mark)	**2**	
	(b)		Use of RLE • Stores the colour of a pixel and • the number of repetitions of the pixel • Reducing the number of pixel values stored Use of JPEG • Takes shades of colour and stores them as one colour • Which can then be stored as a pixel value and number of repetitions Use of LZW • Uses an algorithm to identify patterns • Assigns each pattern a pointer value • Reducing number of pixel values stored MPEG • Stores (key) frames • (Key) frames saved as JPEG • Delta frames save changes between key frames Any other valid Any combination of bullet points stated for a maximum of three marks.	**3**	Use of the terms 'lossy' and 'lossless' without an explanation of compression techniques are not appropriate at Higher. Names on their own (RLE, JPEG, LZW, MPEG) are not a description. 'Removing detail' award one mark. The question relates to compression rather than just a file size reduction. Therefore statements such as: • Reduce frame rate • Reduce resolution • Reduce file size Are not acceptable.

Question			Expected Answer(s)	Max Mark	Additional Guidance
	(c)		Create a web based app rather than a native app (1 mark) And any one of the following: This can then be viewed using any browser (regardless of OS) (1 mark) So that there is no need to install an app (on an OS) (1 mark)	**2**	Development for different Operating Systems is eliminated in the question. Use of emulators is not valid as the question focusses on what EcoCaledonia could do rather than the users.
	(d)		• Encryption is used (to encode the e-mail) • Keys are used to encode or decode data • A public key is used to encrypt/ A private key is used to decrypt the data	**3**	1 mark for use of encryption. 1 mark for use of keys. 1 mark for correct use of public or private keys. Question relates to the transmission of data.
	(e)		• To prevent keylogging • To prevent brute force attacks Either bullet for one mark	**1**	Do not accept 'for security purposes'. Accept a description of not being able to hack the whole password.

Question			Expected Answer(s)	Max Mark	Additional Guidance
14.	(a)		boolean	**1**	
	(b)		This is one approach to solving this problem. **<u>Reference Language</u>** Line 1. SET valid TO True Line 2. IF Length (mobile_number) <> 11 THEN Line 3. SET valid TO False Line 4. ELSE Line 5. FOR counter FROM 1 TO 11 DO Line 6. IF (Mid(mobile_number, counter, 1) < "0") OR (Mid(mobile_number, counter, 1) > "9") THEN Line 7. SET valid TO False Line 8. END IF Line 9. END FOR Line 10.END IF	**5**	Candidates will employ a wide range of approaches to tackling this question. Question is intended to test logical approach to the scenario. • 1 Mark for checking the length of the string • 1 Mark for using a loop to traverse over each character • 1 Mark for use of a correct complex if or loop condition (may include check on first character being zero) An additional mark may be awarded for any of the following bullets for a maximum of two marks. • 1 Mark for use of conditional loop that includes a request for re-entry of mobile number • 1 Mark for valid use of a Boolean • 1 Mark for an error message if an invalid number has been entered
	(c)		• Name of a valid parameter AND passed by reference/byRef (1 mark) • As the value will be updated AND returned/passed out (1 mark)	**2**	Parameters from the form: title, first name, surname, gender, email address, mobile phone number. 'Passed out' alone is not worth a mark.

Question			Expected Answer(s)	Max Mark	Additional Guidance
	(d)	(i)	A hybrid cloud is a combination of a private and public cloud.	**1**	
		(ii)	• Store sensitive data on the private cloud (1 mark) • Can outsource services to public cloud (at times of need) (1 mark) • Can easily expand capacity of public cloud storage without hardware costs (1 mark) • Public cloud use will not results in the purchase of new hardware/servers • Public cloud use reduces cost in relation to backup strategies. (1 mark) Any two bullets for a maximum of two marks.	**2**	Generic security based answers need contextualised in line with use of private cloud. Must specify where cost savings are being made.

Question			Expected Answer(s)	Max Mark	Additional Guidance
15.	(a)		• Use an emulator (to imitate the older operating system) • Virtual machine • Compatibility mode	**1**	
	(b)		• Different groups/profiles • Different rights/permissions • Set up a public folder	**2**	1 mark for each bullet – maximum 2 marks. 'Different users' is too vague for bullet 1. The concept of a group is required. 'Access' is referenced in the stem and requires rights/permissions for a mark.
	(c)	(i)	• Data format conversion/ converting camera signals eg serial to parallel. • Buffering/temporary storage of data in transit between the camera and the computer/ compensates for differences in speed between the camera and the computer. • Handling of status signals/to ensure camera data is received correctly. • Voltage conversion/to change voltage levels of the camera to relevant levels for the computer. • Protocol conversion/ensure camera and computer adhere to the same protocols.	**2**	Question is a 'state' and so underlined terms are acceptable. Note – Analogue to Digital conversion is not an appropriate example of data format conversion in this context. 1 mark for each statement of 2 different functions – maximum 2 marks.
		(ii)	Bit-Map • Bit mapped graphics can be edited in fine detail at pixel level • More realistic images • Less constrained by mathematical objects Vector • Objects can be layered • Scalable without losing resolution/no pixilation • Editing individual attributes	**2**	1 mark for each bullet – max 2 Candidate should provide two reasons to support the type of graphics that they have selected.

Question			Expected Answer(s)	Max Mark	Additional Guidance
	(d)		90 x 25 x 260 x 200 x 24 =334.7 MB Fully worked response: 90 x 25 x 260 x 200 x 24 =2,808,000,000 bits =351,000,000 bytes =342773.4375 KB =334.73 MB =334.7 MB	**2**	1 mark for 1st line. 1 mark for final answer. Second mark is for correct conversion of units to final answer even if first line is incorrect.
	(e)	(i)	Advantage: • reduces the need for computers/ parts to go to landfill • Reduces amount of potentially toxic waste • Any other valid	**1**	
		(ii)	Advantage: • Newer computers are built to high environmental standards • use less power/less carbon footprint • Any other valid	**1**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
16.	(a)		An internal style sheet is embedded within the HTML code for each page (1 mark) whereas an external style sheet is a separate file (that can be used by multiple pages) (1 mark).	**2**	
	(b)		• An external style sheet would be loaded once and (cached locally for future use) (1 mark) • Internal style sheets would be downloaded every time the page is viewed again (1 mark) • Webpages have larger file sizes due to the embedded internal style sheets which take longer to download (1 mark) 1 mark for each bullet	**2**	no need to reuse code can be viewed in line with bullet three.
	(c)		<link rel = "stylesheet" type= "text/css" href= "masterstyle.css">	**2**	1 mark for "stylesheet" 1 mark for "masterstyle.css" Also accept "masterstyle.css" / to allow for XHTML Do not penalise lack of quote marks. .css is needed for second mark.
	(d)		H1 {font-family:Tahoma; color:blue; text-align:center}	**3**	• H1 (or H2) with { } • font-family:Tahoma; • color:blue; • text-align:center **1 mark** for each bullet for a maximum of three marks. Order is not important. Do not accept colour or centre. Answer can be written on one line.

Question			Expected Answer(s)	Max Mark	Additional Guidance
	(e)		• Make use of a keywords meta tag (to include the terms 'Glasburgh Safari' or 'pandas') (1 mark) • Make use of terms 'Glasburgh Safari' or 'pandas' throughout the body of the pages of the website • Include keywords eg ('Glasburgh Safari' or 'pandas') in the title tags (1 mark) • ALT tags on images • Create/submit a sitemap • Any other valid	**2**	'Meta description tags' are not relevant to search engines but provide an overview of content once a search has been returned. Not valid as a response.
	(f)		A query could be used to calculate how many tickets are available (1 mark) An appropriate message is generated from the result of the query (code is used to generate a message)(1 mark)	**2**	1 mark for query. 1 mark for decision to generate a message. Do not accept 'displaying a message' as this was stated in the question.

Question			Expected Answer(s)	Max Mark	Additional Guidance
17.	(a)	(i)	• Assigns values to (element one of) an array • Assigns values to the Test_mark record 1 mark each, maximum of 2 marks	**2**	Must reference both array and record for two marks.
		(ii)	89	**1**	
		(iii)	SET average TO (pupil[1].mark_1+ pupil[1].mark_2+ pupil[1].mark_3)/3	**2**	1 mark for logical average with assignment. 1 mark for reference to the variable pupil at least once. Do not penalise BODMAS errors.
	(b)	(i)	2	**1**	
		(ii)	Logic error	**1**	
		(iii)	• Line 3 needs changed • FOR counter FROM 0 TO 3 DO	**2**	Award 1 mark for line 3 attempt even if incorrect. Candidate does not need to state 'line 3'. Allow: For counter FROM 1 TO 4 DO As this will still traverse four items of the array. This corrects the error of traversing three items instead of four.
	(c)		A – 74.33 B – 1 C – 57.67	**3**	
	(d)		• Stop/pause program at a defined point • to check the values of the variables (match the expected value)	**2**	

[END OF MARKING INSTRUCTIONS]