National
Qualifications
2022

2022 Computing Science

National 5

Finalised Marking Instructions

These marking instructions have been prepared by examination teams for use by SQA appointed markers when marking external course assessments.

General marking principles for National 5 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) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted.

(c) If a candidate response is not 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) Award marks regardless of spelling, as long as the meaning is unambiguous. This applies to all responses, including code.

(e) Award marks as per the detailed marking instructions, regardless of minor syntax errors.

(f) For questions where candidates are asked to design or write code, a sample response may be shown in the detailed marking instructions. This will not be the only valid response. You must use the detailed marking instructions and additional guidance to ensure that you consider alternative approaches and nuances of different programming languages. If in doubt you should refer to your Team Leader.

(g) A correct response can be negated if the candidate includes an extra, incorrect response which demonstrates that the candidate does not know the correct answer. For example, in a state question where the only correct answer is 'white' and the candidate answers 'white orange', the mark should not be awarded.

(h) If a candidate scores through their entire response to a question and makes a further attempt, you should only mark the further attempt. If no further attempt is made and the original is legible, you should mark the original response.

(i) Where an incorrect response is carried forward and used correctly in a following part of the question, you should give credit for subsequent responses that are correct with regard to the original error. Candidates should not be penalised more than once for the same error.

(j) Only award marks for a valid response to the question asked. Where candidates are asked to:

- **Identify**, **name**, **give** or **state,** they need only name or present in brief form.
- **describe**, they must provide a statement or structure of characteristics and/or features. This will be more than an outline or a list. It may refer to, for example, a concept, process, experiment, situation, or facts, in the context of and appropriate to the question. Candidates must make the same number of factual/appropriate points as there are marks available in the question.
- **explain**, they must relate cause and/or effect and/or make relationships between things clear, in the context of the question or a specific area within the question.
- **write code,** they must write recognisable code, not prose nor a diagram.
- **design,** they must use a design technique appropriate to the problem. Award marks as per the detailed marking instructions, regardless of errors in the exemplification of the technique, if the intention of the design is clear.

(k) In the marking instructions, if a word is bracketed() then it is not essential. Words separated by / are alternatives

Marking instructions for each question

Section 1 – Software design and development, and Computer systems

Question			Expected response	Max mark	Additional guidance
1.			00111100	**1**	Must have 8 bits.
2.			One mark for each of the following in the correct place/order: • correct variable names – teamName, totalPoints without quotations • output statement with additional two strings: "scored" and "points" with quotations	**2**	For bullet point two, single or double quotations may be used dependent on language.
3.			One mark for each row, in the correct order. Variable Type integer string	**2**	Accept abbreviations, for example Int, Str. Do not accept "number" or "text" if they are the only answer given.
4.	(a)		conditional	**1**	Must be "type" of loop. Do not accept examples of conditional loops.
	(b)		One mark each for • use of an appropriate variable/description of ticket cost • calculate refund (25% of initial ticket cost)	**2**	Calculation of 25% may vary.
5.			One mark each for • 8916 (mantissa) • 3 (exponent)	**2**	
6.	(a)		15	**1**	
	(b)		One mark for any one from • AND • OR • NOT	**1**	

Question			Expected response	Max mark	Additional guidance
7.			One mark for any object name from • ellipse/circle • text • rectangle/rect • polygon • line One mark for any attribute of object given from • x coordinate • y coordinate • (x, y) coordinates • line thickness • line colour • fill colour • length • breadth	**2**	Only award attribute mark if a correct object is given. Allow other correct attributes. "Colour" not enough on its own. Candidate must specify what is being coloured.

Question			Expected response	Max mark	Additional guidance
8.	(a)		One mark each for any two descriptions of • calculate total (flight) cost • calculate duration of trip • validation of inputs	**2**	Allow additional correct processes that candidates may interpret from the given problem, for example "find flights", "calculate duration of flight".
	(b)		One mark each for • loop for correct number of passengers • input statement referring to bags • if statement with correct condition • running total within loop • total cost calculated (bag cost + booking cost)	**5**	Running total and total cost could be implement in one step. Number of loop iterations and variable used may vary according to language, for example: 0 to passengers, 1 to passengers. Three possible solutions are shown below. Note that there may be others. Loop for each passenger Ask if passenger wants a bag If answer = yes Add £7 onto total End if End loop Loop for each passenger Ask if passenger wants a bag If answer = yes Add 1 onto bag number End if End loop Total = total + bag number * 7 Loop for each passenger Ask if passenger wants a bag If answer = yes Add £7 onto bag total End if End loop Total = total + bag total

Question			Expected response	Max mark	Additional guidance
8.	(c)	(i)	One mark each for • array • Boolean	**2**	
		(ii)	One mark each for • before loop, store a random number with appropriate range (60 seats) • while loop with condition: data structure 'seats' with random number index = false • store a random number (60 seats) again inside loop • after loop, data structure 'seats' with random number index = false	**4**	Accept programming language specific versions of random. If the random value is simply displayed do not award bullet points 1 and 3.
		(iii)	One mark each for • a number/seat generated is more likely to be allocated already • demonstrating an understanding that the above will cause the program to repeat/loop again	**2**	Accept reverse of first bullet: • a number generated is less likely to be available
	(d)		encrypted	**1**	Accept alternative secure methods of transfer with indication why it is secure.

Question			Expected response	Max mark	Additional guidance
9.	(a)	(i)	One mark for any one from • flow chart • structure diagram	**1**	
		(ii)	One mark for any one from • logic errors were found at a later stage • new functionality is requested • the program is not fit for purpose	**1**	Wording will vary. Accept other appropriate examples. Do not accept "check for errors".
	(b)	(i)	One mark for each design of input validation showing • conditional loop • correct loop condition for valid data • input of price inside loop • error message	**4**	If there is no loop: • one mark may be awarded for input • one mark may be awarded for error message if inside an if statement with correct conditions If the loop is missing the start/end of the loop assume that everything above or below the start/end is inside the loop. While minimum < 50000 OR maximum > 600000 Until minimum >= 50000 AND maximum <= 600000 As this is design accept between 50000 and 600000
		(ii)	One mark for one extreme value from • 50000 • 600000 One mark for one numerical exceptional value • less than 50000 • more than 600000	**2**	Marking should focus on the numerical values and may ignore spaces or commas that candidates may add.

Question			Expected response	Max mark	Additional guidance
9.	(c)	(i)	One mark for any one from • used to show the start and end of the if structure • to clearly show what code is inside the if statement	**1**	Answer must relate to "the code above" so should reference the if statement or line 12.
		(ii)	One mark for any one from • (add an) internal comment • (use) meaningful variable names	**1**	
		(iii)	80(bits)	**1**	
		(iv)	logic	**1**	
	(d)		compiler	**1**	

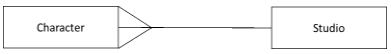
Question			Expected response	Max mark	Additional guidance
10.	(a)		One mark each for • entry of floor area with user instruction and input area • entry of number of rooms requiring skirting with user instruction and input area • total cost with label	**3**	Input area and user instruction may be combined within one box. Award 0 marks if the candidate has designed a program (pseudocode, flow chart, structure diagram) rather than a user interface. Ignore any additional objects/ text/buttons that may have been added to the user interface.
	(b)	(i)	ALU or Arithmetic Logic Unit	**1**	
		(ii)	registers	**1**	
	(c)		One mark each for • loop 5 times • input of job assigned within loop • running total within loop • correct use of array	**4**	Number of loop iterations declared may vary according to language, eg 0 to 5, 1 to 5, 0 to 4, 1 to 6 To avoid double penalising, along with bullet point two, award mark for correct use of an array once in the answer.
	(d)	(i)	One mark each for • each pixel • is stored as a binary value (bits)	**2**	Binary must be related to each pixel.
		(ii)	One mark for any one from • reduce brightness of screen • power down settings • switch off when not in use • close down un-used apps/windows	**1**	Terminology used in answers may vary.

Section 2 – Database Design and Development

<table>
<tr><th colspan="3">Question</th><th>Expected response</th><th>Max mark</th><th>Additional guidance</th></tr>
<tr><td>11.</td><td></td><td></td><td>text</td><td>1</td><td>Accept SQL data types
• varchar
• char</td></tr>
<tr><td>12.</td><td>(a)</td><td></td><td>One mark for two correct headings, in correct order
• forename, surname

One mark for each row of the search results
• Julie White
• Olivia Arran</td><td>3</td><td>Example output:
forename surname
Julie White
Olivia Arran
Output must appear on a line on its own.

Ignore the table name if it is included in the answer.

If the search results include Julia and Olivia and any additional rows:
• award 1 mark instead of the 2 available for the search results.</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Compare expected results to actual results.</td><td>1</td><td></td></tr>
<tr><td>13.</td><td>(a)</td><td></td><td>One mark for any from
• 

• many characters (are created by) one studio</td><td>1</td><td>Allow other acceptable one to many design notations (1-M, N-M, 1-∞)

Ignore any additional information added (attributes, keys).</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>One mark each for
• name, style with no other fields
• Studio, Character
• Location = Japan
• studioName = Goban
• createdBy = K. Bell
<table><tr><td>Field(s)</td><td>name, style</td></tr><tr><td>Table(s)</td><td>Studio, Character</td></tr><tr><td>Search Criteria</td><td>location = Japan
studioName = Goban
createdBy = K. Bell</td></tr></table></td><td>5</td><td>Allow use of dot notation with fields

Logical operators and equi-joins are not required in the search criteria as this is design.

If logical operators are used then they must produce the correct result. If they do not, the first criteria may be marked correct and subsequent criteria should be marked as incorrect.</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>One mark each for
• SELECT name, style, appearances
• FROM Studio, Character
• WHERE studioName = “Desney”
• AND Studio.studioID = Character.studioID
• ORDER BY appearances (ASC)</td><td>5</td><td>Ignore second sort, as long as appearances is the first sort.

Select fields must be in the order given.
The table names in FROM and the WHERE conditions may be in any order.</td></tr>
</table>

Question			Expected response	Max mark	Additional guidance

14.	(a)	(i)	One mark each for
			• Primary Keys
			  o Room - name
			  o Task - taskID
			• Foreign Key
			  o Task - name
				2	Attributes may be marked in a variety of ways (PK/FK, underlines, asterisk etc) but must be consistent.
					
					If two or more attributes on either the Room or Task entities are marked PK, award 0 for the first bullet.
					
					If two or more attributes are marked FK, award 0 for the second bullet.

		(ii)	tradesPerson	**1**	Accept "completed".
	(b)		no personal information is being stored	**1**	

	(c)		One mark each for
			• SQL commands correct
			  o INSERT INTO Task
			  o VALUES
			• Correct 6 fields identified within SQL clause
			• Correct 6 matching values identified within SQL clause
			
			`INSERT INTO Task (taskID,description,dateStarted,completed,tradesPerson,name) VALUES (9, "construct porch", "19/4/2022", False, "builder", "Porch");`
				3	Award 1 mark for the last two bullets if the number of fields matches the number of values but there are more or less than the correct 6 fields and values.
					
					taskID must be >= 9

	(d)		One mark each for • `DELETE FROM Task` • `WHERE name="bedroom";`	**2**	Do not award second bullet point for `taskID = 5 OR taskID = 7 OR taskID = 8`

Section 3 – Web Design and Development

Question			Expected response	Max mark	Additional guidance
15.			One mark for any Property from • font-family • color • text-align One mark for any one from • menu • .menu	**2**	Award first bullet when values are included with the property.
16.			external	**1**	
17.			One mark each for • logo is not at top left • information text about the company is not provided	**2**	
18.	(a)	(i)	(low-fidelity) prototype	**1**	
		(ii)	For low-fidelity prototype or blank answer for part (i), one mark each for any two from • show the contents of the website to the end-user • show the client the user interface (look and feel) • test navigation	**2**	Accept valid reasons for other valid web design methodologies. For example, if candidate answers wireframe for part (i), one mark each for any two from: • to show layout of page (elements) • to show hyperlinks/navigation • ensure consistency
	(b)	(i)	white	**1**	

		(ii)	One mark each for
			• correct selector
			• both correct declarations
				2	`div{`
					`  text-align:right;`
					`  font-family:arial;`
					`}`

	(c)		One mark each for
			• correct path `graphics/`
			• correct file name and file type `dog.jpg`
				2	Path name should not include preceding folders as the path relates to the location of 'services.html'.
					
					`graphics/dog.jpg`
					
					Allow:
					`./graphics/dog.jpg`
					as ./ points to the current folder

Question			Expected response	Max mark	Additional guidance
	(d)	(i)	jpg/jpeg	**1**	Accept other file types with 24bit colour depth and no transparency.
		(ii)	One mark for any one from • high resolution • the image is 4000px x 2500px	**1**	
19.	(a)	(i)	One mark each for • 'Katrina's Cars' above graphic and right aligned • 'Top deals' left-aligned and below graphic • unordered list with bullet points, left-aligned and below 'Top deals' • vertical list of three list items  	**4**	Do not award a mark if text is underlined as this is not included in the code. Do not award a mark for a bullet if the content of the bullet is repeated. Ignore discrepancies in text size.

		(ii)	One mark each fors
			• newCar class used in
			• with text - Morcodes GLS
			
			`<li class= "newCar">`
			`Morcodes GLS </li>`
				2	

	(b)		adds a hyperlink	**1**	Accept a description of a hyperlink
	(c)		JavaScript	**1**	
	(d)		Copyright, Designs and Patents (Act)	**1**	
	(e)		It's a request by the user to change the website (and not a statement of what the system must do)	**1**	Answer should relate to the required change to the website and not just to the scenario (cancelling a bid).

[END OF MARKING INSTRUCTIONS]