Cambridge Assessment International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9608/32**

Paper 3 Written Paper **October/November 2020**

MARK SCHEME

Maximum Mark: 75

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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[Turn over

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

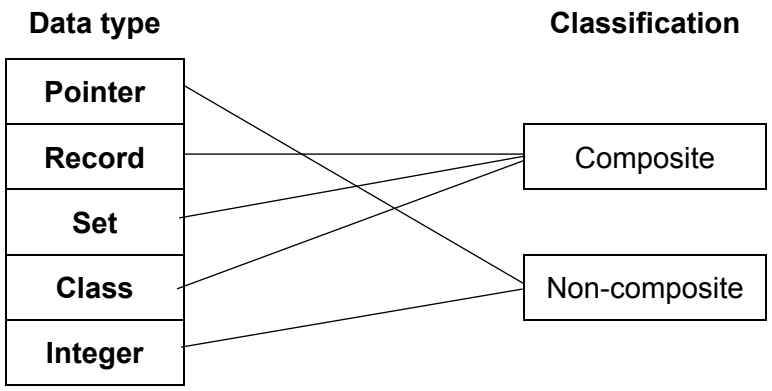
Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Question	Answer	Marks
1(a)	Exponent = 6 (conversion of exponent to denary) 0.101 or 0.625 or 5/8 (value of mantissa) // moving of binary point 40 (answer)	**3**
1(b)(i)	Exponent = 5 (conversion of exponent to denary) 0.00000000110 or 3/1024 (value of mantissa) // moving of binary point 0.09375 or 3/32 (answer)	**3**
1(b)(ii)	Any **two** from The number calculated will change The same bit pattern is for a different number Software may crash (if not updated)	**2**

Question	Answer	Marks
2(a)	**2** marks for all 5 single lines correct **1** mark for 4 lines correct otherwise zero 	**2**
2(b)(i)	Type **Enumerated** Classification **Non-composite**	**2**
2(b)(ii)	`DECLARE session : timeOfDay` `session ← afternoon`	**2**

Question	Answer	Marks
3(a)	Set of rules For (successful) transmission (and receipt) of data	**2**
3(b)	**One** mark for protocol, **one** mark for purpose must match protocol Any **two pairs** from Protocol: POP3 Purpose: downloading email Protocol: SMTP Purpose: sending/transferring email Protocol: IMAP Purpose: downloading email // storing/organising emails on an email server Protocol: HTTP/HTTPS Purpose: accessing email using a browser	**4**

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Question	Answer	Marks
3(c)(i)	**One** mark for method, max **two** marks for description Method: Circuit switching Description: Set up for the duration of the conversation Set up before communication starts Maintained throughout the transmission All data travels down the same route Dropped at the end of the transmission Complete bandwidth used	**3**
3(c)(ii)	**One** mark for benefit, **one** mark for limitation Benefit: Manav and Miora can see other in real time // better synchronisation // full bandwidth available Drawback: Bandwidth / channel not available to other users // extra time required to set up circuit at start of conversation // alternative route not available without restarting the conversation // less secure as easier to intercept data if only one channel used // failure single route used means failure of transmission	**2**

Question	Answer	Marks
4(a)	For X **1** mark for all products correct For Y **2** marks for 3 products correct, no other products seen $X = \overline{A}.\overline{B}.\overline{C} + A.B.C$ $Y = \overline{A}.B.C + A.\overline{B}.C + A.B.C$	**3**
4(b)	**One** mark for each correct K-map max 2 **OUTPUT X** / **AB** **C** \ **AB**: 00 01 11 10 **0**: 1 0 0 0 **1**: 0 0 1 0 **OUTPUT Y** / **AB** **C** \ **AB**: 00 01 11 10 **0**: 0 0 0 0 **1**: 0 1 1 1	**2**
4(c)(i)	**One** mark for OUTPUT X no loops **One** mark for OUTPUT Y all loops correct and no others max 2 **OUTPUT X** / **AB** **C** \ **AB**: 00 01 11 10 **0**: 1 0 0 0 **1**: 0 0 1 0 **OUTPUT Y** / **AB** **C** \ **AB**: 00 01 11 10 **0**: 0 0 0 0 **1**: 0 1 1 1	**2**

Question	Answer	Marks
4(c)(ii)	**One** mark for each correct product A.C + B.C	**2**

Question	Answer	Marks
5	(logic) Circuit // bi-stable Two Memory // data storage // registers // storing one bit of data JK/SR/D/T SR/JK/T/D	**5**

Question	Answer	Marks
6(a)	Max **three**, **one** mark for role, **one** mark for expansion OS1, OS2 and OS3 are guest operating systems … secondary to the one installed on the hardware OS4 is the host operating system … interacts directly with the machine hardware MyApp needs to run on all three guest operating systems … … with identical results	**3**
6(b)	Any **three** from Create/delete/manage virtual machine Translate instructions used by guest operating system to that required by host operating system Hardware emulation Protecting each virtual machine … so instances of MyApp can be tested together	**3**
6(c)	**One** mark for benefit and **one** mark for relevant explanation **One** mark for drawback **one** mark for relevant explanation For example: Benefit: multiple operating systems can exist simultaneously … allowing for testing using the same hardware only one set of hardware required ... reduces cost of producing the app // no need to set up more than one computer Drawback: execution of extra code … so performance is degraded // more time taken to execute the app // cannot make judgements about response time etc	**4**

Question	Answer	Marks
7(a)	Any **three** from Applied to an issuing certificate authority / CA … with some proof of identity … (for example) name of organisation / address of organisation etc … so their identity can be checked by an organisational registration authority / ORA … so that a digital certificate will only be issued to a trusted organisation	**3**
7(b)	**one** mark for item, **one** mark for reason; must relate to item Max 4 Item: public key Reason: to encrypt / decrypt data Item: agreed encryption/hashing algorithm Reason: to produce hash total / message digest	**4**
7(c)	Any **two** from Serial number Name of subject/organisation Date valid from/to Signature to verify it came from the issuers Name of issuer Purpose of the public key Thumbprint algorithm Thumbprint/fingerprint for the hash CA digital signature	**2**
7(d)	Any **four** from Message is put through agreed hashing / encryption algorithm … to produce a hash total / message digest then the message digest / hash total is encrypted … with Sam's private key … … this is now his digital signature	**4**

Question	Answer	Marks
8(a)	44 kilometres 5.125 litres Low battery	**3**
8(b)	**One** mark for `601` correct **One** mark for `602` correct **One** mark for `603` correct	**3**

`601`	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**
`602`	**0**	**0**	**1**	**1**	**1**	**0**	**1**	**0**
`603`	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**

Question	Answer	Marks

8(c)(i)	1 mark per bullet point
	• Storing 0 in `601` and `602`
	• Loading the correct pattern for `603`
	• … Storing in `603`
	
	`LDM &00 /#0 / B00000000`
	`STO 601`
	`STO 602`
	`LDM B00001111 /#15 /&0F`
	`STO 603`
		3

8(c)(ii)	`&02 / #2 / B00000010`
	`&04 / #4 / B00000100`
	`TEMP`
	`CHECKFLAGS`
		4

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