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Cambridge International Advanced Level

MARK SCHEME for the May/June 2015 series

9608 COMPUTER SCIENCE

9608/31 Paper 3 (Written paper), maximum raw mark 75

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1 (a) (i)	';' missing	1
(ii)	'2' is not a variable	1
(iii)	'e' is not a valid letter	1
(b)	<assignment statement> ::= <variable> = <variable><operator><variable>; <variable> ::= <letter>|<letter><letter> |<letter><letter><letter> <letter> ::= a|b|c|d <operator> :: =+|-|*|÷	2 2 1 1
(c)	<letter> | <letter><variable> // <letter> | <variable><letter>	2

(d) (i)	debugging is faster / easier
	// can debug incomplete code
	// better diagnostics
		1

(ii)	compiler produces executable version – not readable / no need for source code // difficult to reverse-engineer	1
		Total: 13
2 (a)	• Spam • Worm **Pharming** redirect website to fake website // domain name server compromised // proxy server compromised **Phishing** through email attempt to obtain somebody's confidential data / install malware	1 1 1 1
(b)	**Spam** • user's inbox is filled by large amount of unwanted email • user / email server employs filtering software that can divert / delete spam email **Worm** • could corrupt user's computer // delete data // consume bandwidth • run anti-virus software in the background // not connect to the Internet // keep OS up-to-date	1 1 **or** 1 1

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(c)	**encryption**: process of turning plain text into cipher text **public key**: key widely available that can be used to encrypt message that only owner of private key can decrypt // can be used to decrypt a message thereby confirming originator of message	1 1
(d) (i)	digital signature	1
(ii)	• software is put through hashing algorithm • hash total is encrypted with private key (digital signature) • software + encrypted hash / digital signature are sent • receiver is in possession of sender's public key • the received hash total / digital signature is decrypted with public key (SH) • the receiver hashes received software (RH) • If SH matches RH then software is authentic and has not been altered	Any **four** points 1 mark each
		Total: 13
3 (a) (i)	enumerated	1
(ii)	record	1
(iii)	`MyMonthOfBirth ← DateOfBirth.ThisMonth`	1

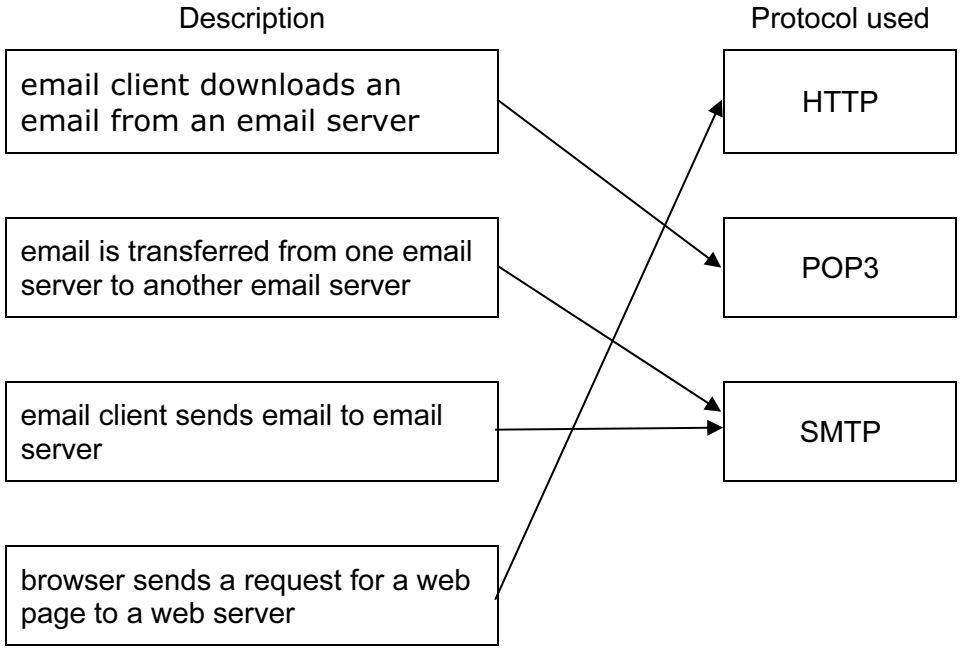
(b) (i)	`TYPE LocationRainfall`
	`  DECLARE LocationName : STRING`
	`  DECLARE LocationHeight : INTEGER`
	`  DECLARE TotalMonthlyRainfall : ARRAY[1..12] OF REAL`
	`ENDTYPE`
		1
		1
		1
		1 +1

(ii)	• no need to re-sort data every time new data is added • only a small file so searching will require little processing • new records can easily be appended	1 1 1 [max 2]
		Total: 10
4 (a) (i)	Circuit 1 A B X 0 0 **1** 0 1 **1** 1 0 **1** 1 1 **0**	1

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(ii)	<table><tr><th colspan="3">Circuit 2</th></tr><tr><th>A</th><th>B</th><th>X</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table>	1
(b) (i)	• circuit 1: $\overline{A.B}$ • circuit 2: $\overline{A} + \overline{B}$	1 1
(ii)	$\overline{A.B} \equiv \overline{A} + \overline{B}$	1
(c)	$\overline{\overline{(A+B)}.B}$ Mark as follows: $\overline{(A+B)}$ $.B$ bar over whole expression	 1 1 1
(d)	$\overline{\overline{(A+B)}.B}$ $= \overline{\overline{(A+B)}} + \overline{B}$ $= (A+B) + \overline{B}$ $= A + (B + \overline{B})$ $= A + 1$ $= 1$ allow f.t. from **(c)**	 1 1 1 1 1 [max 3]
		Total: 11
5 (a)	Monitoring system	1
(b)	• temperature sensor … • transmits measured temperature • analogue to digital converter … • converts analogue signal from sensor to digital value that can be stored • storage device // data logger… • for recording readings from sensor • transmission hardware … • to transfer data from sensor to storage device • processor … • to process incoming data	1 1 1 1 1 1 1 1 1 1 [max 6]

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(c) (i)	temperature reading in location 5 has been processed	1 1
(ii)	0100 0000 1111 1011 1 mark per byte	2
(d) (i)	`AND #B00010000 // AND #&10 // AND #16` 1 mark for `AND`, 1 mark for address mode, 1 mark for mask, 1 mark for indication of numbering system	1 + 1 + 1 + 1
(ii)	`OR #B00000001 // OR #&01 // OR #1` 1 mark for `OR`, 1 mark for mask	1 +1
		Total: 17
6 (a)		1 mark for correct arrow from each description
(b)	peer-to-peer	1

(c) (i)	**Tracke**r: central server that:
	stores details of other computers that have all / part of file to be downloaded
	// has data on those peers downloading and uploading file
	// shares IP addresses with other clients in swarm allowing them to connect
		1
		
		1

(ii)	**Seed**: peer computer that has 100% of file // is uploading downloaded content	1 1
(iii)	**Swarm**: all the connected peer computers that have all or part of the file to be downloaded / uploaded // share a torrent	1 1
		Total: 11

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