MARK SCHEME for the May/June 2015 series

9608 COMPUTER SCIENCE

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

1	**(a)**	**(i)**	';' missing	1

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 fast<u>er</u> / eas<u>ier</u>
			// 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** <u>through email</u> 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

(c)	**encryption**: process of turning plain text into cipher text		1
	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
(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<br>1<br>1<br>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

(ii)					
		Circuit 2		
		A	B	X	
		0	0	**1**	
		0	1	**1**	
		1	0	**1**	
		1	1	**0**	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]

(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)**	Description Protocol used email client downloads an email from an email server → HTTP email is transferred from one email server to another email server → POP3 email client sends email to email server → SMTP browser sends a request for a web page to a web server	1 mark for correct arrow from each description
(b)		peer-to-peer	1

(c)	**(i)**	**Tracker**: 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