MARK SCHEME for the May/June 2015 series

9608 COMPUTER SCIENCE

9608/33   Paper 3 (Written Paper), maximum raw mark 75

1	(a)	(i)	Wrong assignment operator (should be ':=' not '=')	1
		(ii)	0 is not a digit	1
		(iii)	'B' is not a number	1

	(b)		`<assignmentstatement> ::=`
			 `<variable> := <variable><operator><number>`
			 `<variable> ::= <letter><number>`
			 `<number> ::= <digit>| <digit><number>`
			 `<letter> ::= A|B|C`
			 `<digit> ::= 1|2|3|4|5`
			 `<operator> ::= +|-|*|/`
				1 + 1
				1
				1 + 1
				1

	(c)	(i)	Use of <u>software</u> … (idea of using) to implement a <u>hardware</u> set-up (idea of implementing / simulating / emulating)	1 1
		(ii)	e.g. no need to acquire client hardware for testing / reduces set-up time for test system / common development system for all developers	1
		(iii)	e.g. software emulation runs slower than real hardware / not possible to emulate some hardware	1
				Total: 13
2	(a)		 1 mark for correct arrow(s) from each description	1 1 1 1
	(b)	(i)	**Server**: central computer stores files that are to be downloaded	1 1

	(ii)	**Command**: user can send action/instruction (or by example, e.g. change directory) that are carried out on server		1 1
	(iii)	**Anonymous**: allows user to access files user does not need to identify themselves to server		1 1
				Total: 10
3	(a)	A Phishing B Virus C a standalone piece of software which can reproduce itself automatically D sending unsolicited emails to a distribution list		1 1 1 1
	(b)	e.g. phishing **problem**: identity fraud / misuse of financial data **solution**: ignore email / don't respond to email e.g. virus **problem**: computer may stop working // lost files **solution**: running anti-virus software		 1 1 **or** 1 1
	(c)	**cipher text**: encrypted text which is not understandable **private key**: key only known to owner that can be used to encrypt message to confirm author of message // can be used by owner to decrypt a message thereby ensuring only owner can read message		1 1
	(d)	• Manager encrypts email • using public key of colleague • colleague decrypts email • using his/her private key		1 1 1 1
				Total: 12
4	(a) (i)	`HomeAddress.ThisHouseNo ← 34`		1

	(ii)	`DECLARE ThisHouseNo: 1..10`
		
		`DECLARE ThisTown: [Brightown, Arunde, Shoram]`
				1
				
				1

	(b) (i)	`TYPE WeatherStation`
		`    DECLARE StationID   : STRING`
		`    DECLARE Latitude    : REAL`
		`    DECLARE Temperature : ARRAY[1..15] OF INTEGER`
		`ENDTYPE`
				1
				1
				1 + 1
				1

	(ii)	`StationID` is hashed to produce home location If home location is free insert record Else use overflow method to find free location		1 1 1
				Total: 11

5 (a) (i)

Circuit 1		
A	B	X
0	0	**1**
0	1	**0**
1	0	**0**
1	1	**0**

1

(ii)

Circuit 2		
A	B	X
0	0	**1**
0	1	**0**
1	0	**0**
1	1	**0**

1

(b) (i)

circuit 1 $\overline{A+B}$

circuit 2 $\overline{A}\,.\,\overline{B}$

1
1

(ii)

$\overline{A+B} \quad \equiv \quad \overline{A}\,.\,\overline{B}$

1

(c)

$\overline{(A.B)+B}$

mark as :

$\overline{(A.B)}$

$+B$

bar over whole expression

1
1
1

(d)

$\overline{\overline{(A.B)}+B}$

$= \overline{\overline{(A.B)}}\,.\,\overline{B}$

$= (A.B).\overline{B}$

$= A.(B.\overline{B})$

$= A.0$

$= 0$

allow f.t. from (c)

1
1
1
1
1

max 3

		Total: 11

6	(a)		Control system	1
	(b)		Any three different items – max 6 marks	
			heater / water pump / blinds pump …	1
			for altering temperature / watering / light level	1
			actuator for…	1
			fan for distributing air / water pump / blinds motor	1
			analogue to digital converter / digital to analogue convertor …	1
			converts analogue signal from sensor to digital value for processing / converts digital signal to analogue signal for controlling actuator	1
			microprocessor …	1
			executes control software	1
			warning device (speaker/buzzer/light)…	1
			to give warning if conditions out of range / hardware malfunction	1
				max 6
	(c)	(i)	output of system (alter temperature / light level / soil moisture) affects input from sensors continuous	3
		(ii)	min / max / ideal / mean / extreme temperature // sampling rate // tolerance interval	1
		(iii)	reading from sensor is compared with parameter appropriate action is taken (by example)	2
	(d)	(i)	reading available for processing reading value is 4	1 1
		(ii)	AND #B00000100 // AND #&04 // AND #4 1 mark for AND, 1 mark for address mode, 1 mark for mask, 1 mark for indication of numbering system	max 3
				Total: 18