Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE **0478/01**

Paper 1 Theory **For Examination from 2015**

SPECIMEN MARK SCHEME

1 hour 45 minutes

MAXIMUM MARK: 75

This document consists of **8** printed pages.

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[Turn over

1 **(a)** 1 mark for the correct working in BOTH parts
1 mark for valid
1 mark for not valid

Identification number 1: working
= (4 × 6) + (2 × 5) + (1 × 4) + (9 × 3) + (2 × 2) + (3 × 1)
= 24 + 10 + 4 + 27 + 4 + 3
= 72 ÷ 11
= 6 remainder **6**
valid/not valid: NOT valid

Identification number 2: working
= (8 × 6) + (2 × 5) + (0 × 4) + (1 × 3) + (5 × 2) + (6 × 1)
= 48 + 10 + 0 + 3 + 10 + 6
= 77 ÷ 11
= 7 remainder **0**
valid/not valid: VALID [3]

(b) 1 mark for correct working + 1 mark for check digit

working
= (5 × 6) + (0 × 5) + (2 × 4) + (4 × 3) + (1 × 2)
= 30 + 0 + 8 + 12 + 2
= 52
need to add **3** to make the total **55** (i.e. exactly divisible by 11)

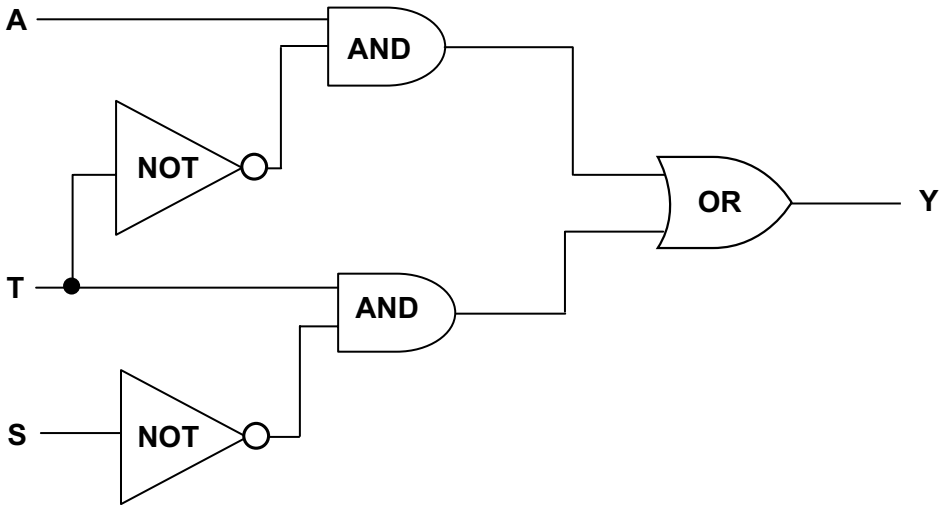
check digit: **3** [2]

(c) 1 mark for each description and example

2 digits transposed
(e.g. 280**41**9 becomes 280**14**9/two digits have been switched)
incorrect digit
(e.g. 2**8**0419 becomes 2**5**0419/one of the digits has been mistyped) [2]

2 – direct access because of concentric tracks
– can read and write at the same time because it has a read/write head [2]

3 **(a)** 1 mark for each logic gate correctly connected



[5]

(b)

A	T	S	Y	
0	*0*	*0*	0	1 mark
0	*0*	*1*	0	
0	*1*	*0*	1	1 mark
0	*1*	*1*	0	
1	*0*	*0*	1	1 mark
1	*0*	*1*	1	
1	*1*	*0*	1	1 mark
1	*1*	*1*	0	

[4]

4 **(a)** 1 mark for hours; 1 mark for minutes

1 6 : 4 9
1 mark 1 mark [2]

(b) 1 mark for each digit

0 0 0 1 1st digit
0 1 1 1 2nd digit
0 0 1 0 3rd digit
1 0 0 1 4th digit [4]

(c) Any **two** from:
- microprocessor compares present time with stored time
- if the values are the same
- sends signal to sound alarm [2]

5 **(a)** Yes [1]

(b) No [1]

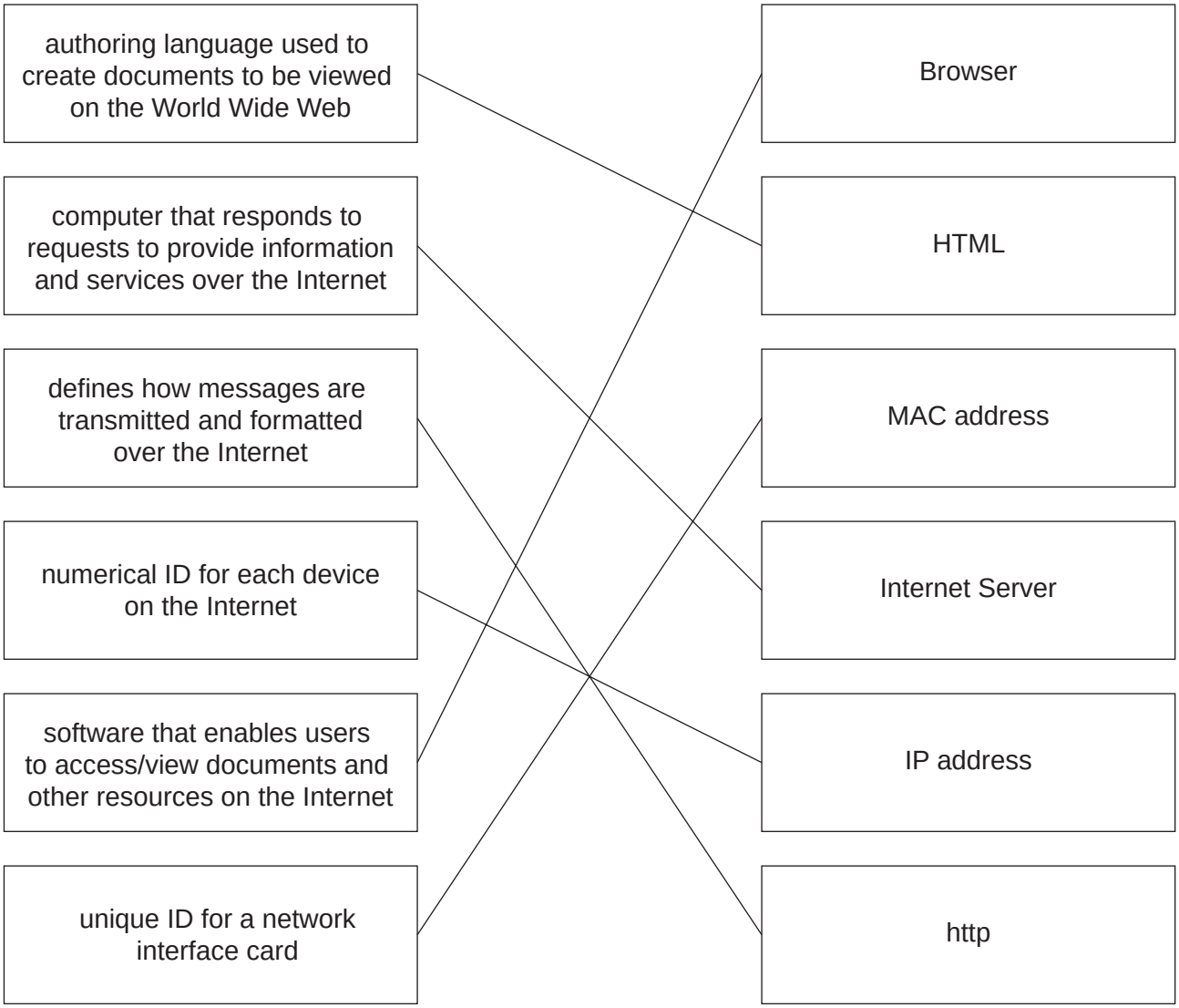
(c)
- re-reading the byte that was sent
- request that the byte is resent [2]

6 **(a)** Only answers:
- temperature (sensor)
- oxygen (sensor) [2]

(b) Any **four** from:
- information from the sensors sent to microprocessor
- the ADC converts the analogue data into digital form
- if temperature < 25ºC OR temperature checked against stored value
- ...microprocessor sends signal to heater/actuator/valve...
- ...to switch on heater
- if oxygen level < 20 ppm OR oxygen level checked against stored value
- ...to open valve/oxygen supply
- use of DAC between microprocessor and devices
- sounds an alarm if system unable to respond
- continuously monitors sensor inputs
- any reference to feedback [4]

(c) Any **one** from:
- unsafe limit stored in memory
- warning sound/signal if too high a value reached
- fail safe switch off in case of a malfunction [1]

7 (a)



5/6 matches – 5 marks
4 matches – 4 marks
3 matches – 3 marks
2 matches – 2 marks
1 match – 1 mark [5]

(b) any **two** from:
- to enable logon information to be kept on his computer
- to provide pages customised for Ahmed the next time he logs on
- to implement shopping carts and one-click purchasing
- to be able to distinguish between new and repeat visitors to the website [2]

8 **(a)** **(i)** Any **one** from:
- unit of data/memory
- 8 bits
- used to represent a character [1]

(ii) Any **one** from:
- 2^{30} bytes
- 1 073 741 824 bytes
- 1 048 576 kilobytes
- 1024 megabytes [1]

(b) Any **two** from:

Flash memory
- solid state memory
- no formatting issues
- plugs directly into the USB port
- direct transfer of data

CD-RW
- optical media
- slower access speed/flash memory has faster access speed
- requires a separate drive
- data needs to be burnt/finalised/finished (before being used on another device) [2]

9 **(a)** Any **one** from:
- buffer
- RAM [1]

(b) – interrupt [1]

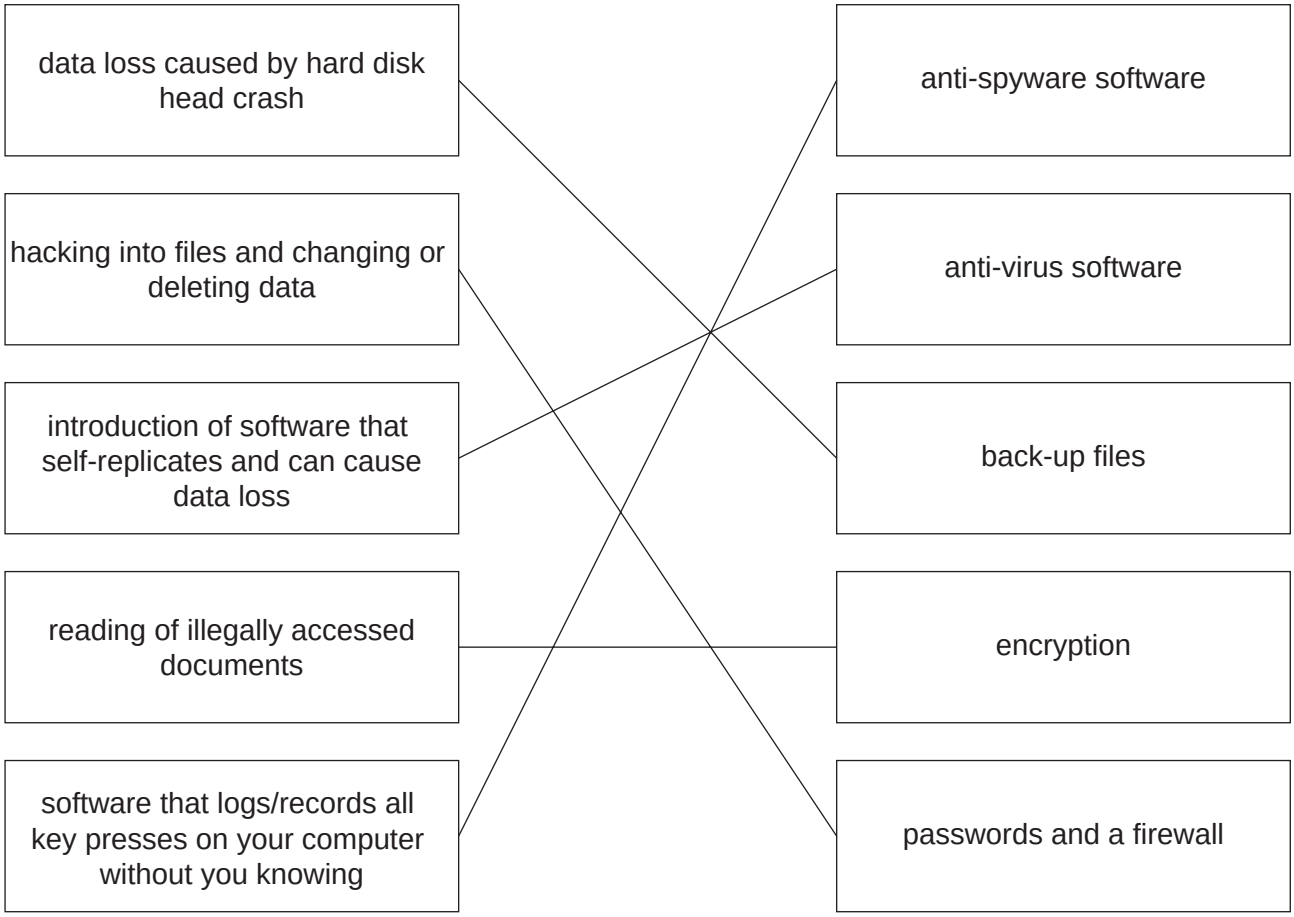
10 **(a)** 1 mark for each correct word

(i) Hello World [2]

(ii) Nmilozgu Pnwgyng [2]

(b)
- use of Secure Socket Layer
- the key itself is encrypted using strong encryption [2]

11



5/4 matches – 4 marks
3 matches – 3 marks
2 matches – 2 marks
1 match – 1 mark [4]

12 **(a)** code B [1]

(b) Any **one** from:
- no need to understand workings of a computer
- easier to understand for programmer/closer to English
- much easier to debug
- much easier to test
- one-to-many when writing commands
- not machine-specific/portable [1]

(c) Any **one** from:
- can address memory addresses directly
- no need for compilers/interpreters
- shorter code/code requires less storage/RAM
- can be written to run faster [1]

(d) – compiler produces object code / interpreter doesn't produce object code
– compiler translates whole program in one go / interpreter translates and executes line at a time
– compiler produces list of all errors / interpreter produces error message each time an error encountered
– compiler produces "stand alone code" / interpreter doesn't produce "stand alone code"
– compilation process is slow but resultant code runs very quickly / interpreted code runs slowly [2]

13 (a) (i) 01000001
01000011 [2]

(ii) 41
43 [2]

(b) FA97 [4]

(c) – easier to identify values
– easier to spot errors [2]