COMPUTER SCIENCE	0478/01
Paper 1 Theory	**For Examination from 2015**
SPECIMEN MARK SCHEME	
	1 hour 45 minutes

MAXIMUM MARK: 75

CAMBRIDGE
International Examinations

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

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

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

<u>working</u>
= (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)

<u>check digit</u>: **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)
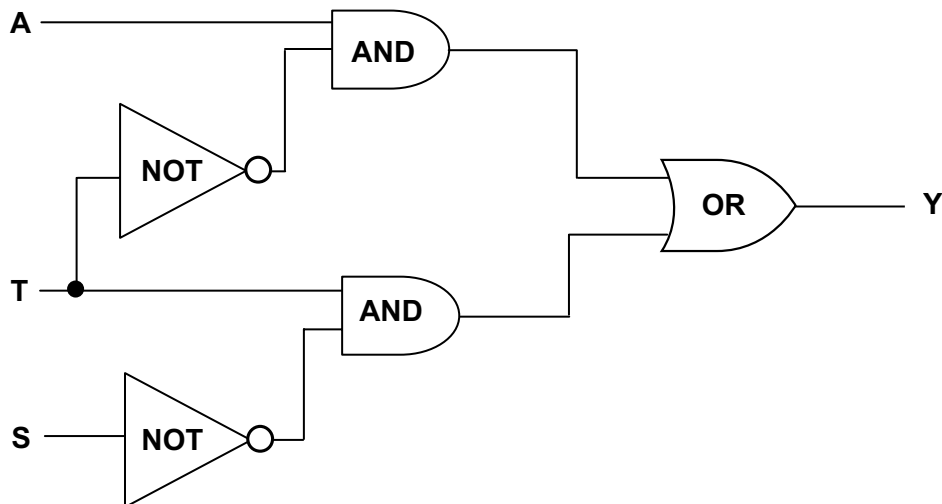incorrect digit
(e.g. 2**8**0419 becomes 2**5**0419/one of the digits has been mistyped)   [2]

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   <u>temperature</u> checked against stored value
- – ...microprocessor sends signal to heater/actuator/valve...
- – ...to switch on heater
- – if oxygen level < 20 ppm   OR   <u>oxygen</u> 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
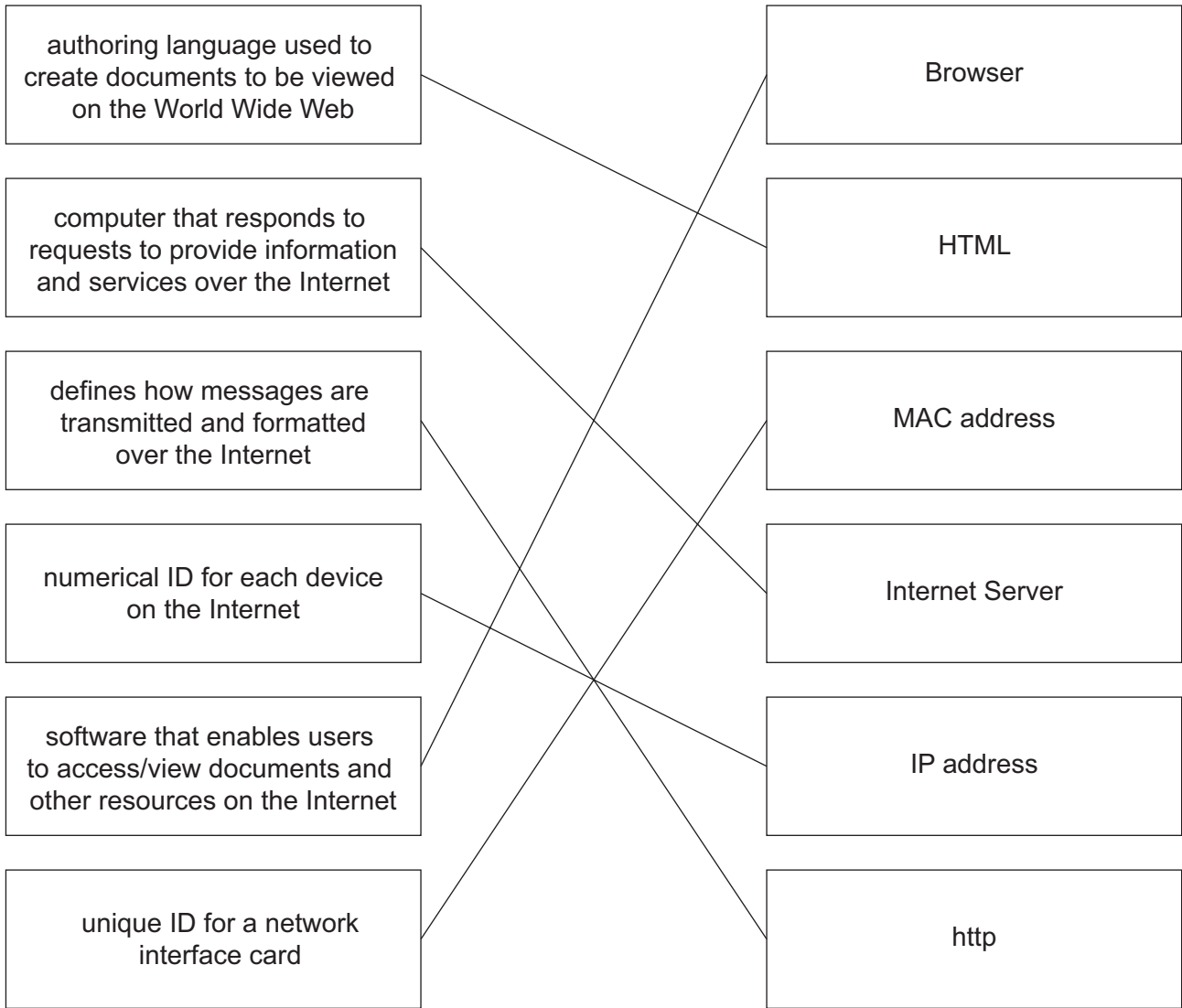- – any reference to feedback [4]

(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)

authoring language used to create documents to be viewed on the World Wide Web		Browser
computer that responds to requests to provide information and services over the Internet		HTML
defines how messages are transmitted and formatted over the Internet		MAC address
numerical ID for each device on the Internet		Internet Server
software that enables users to access/view documents and other resources on the Internet		IP address
unique ID for a network interface card		http

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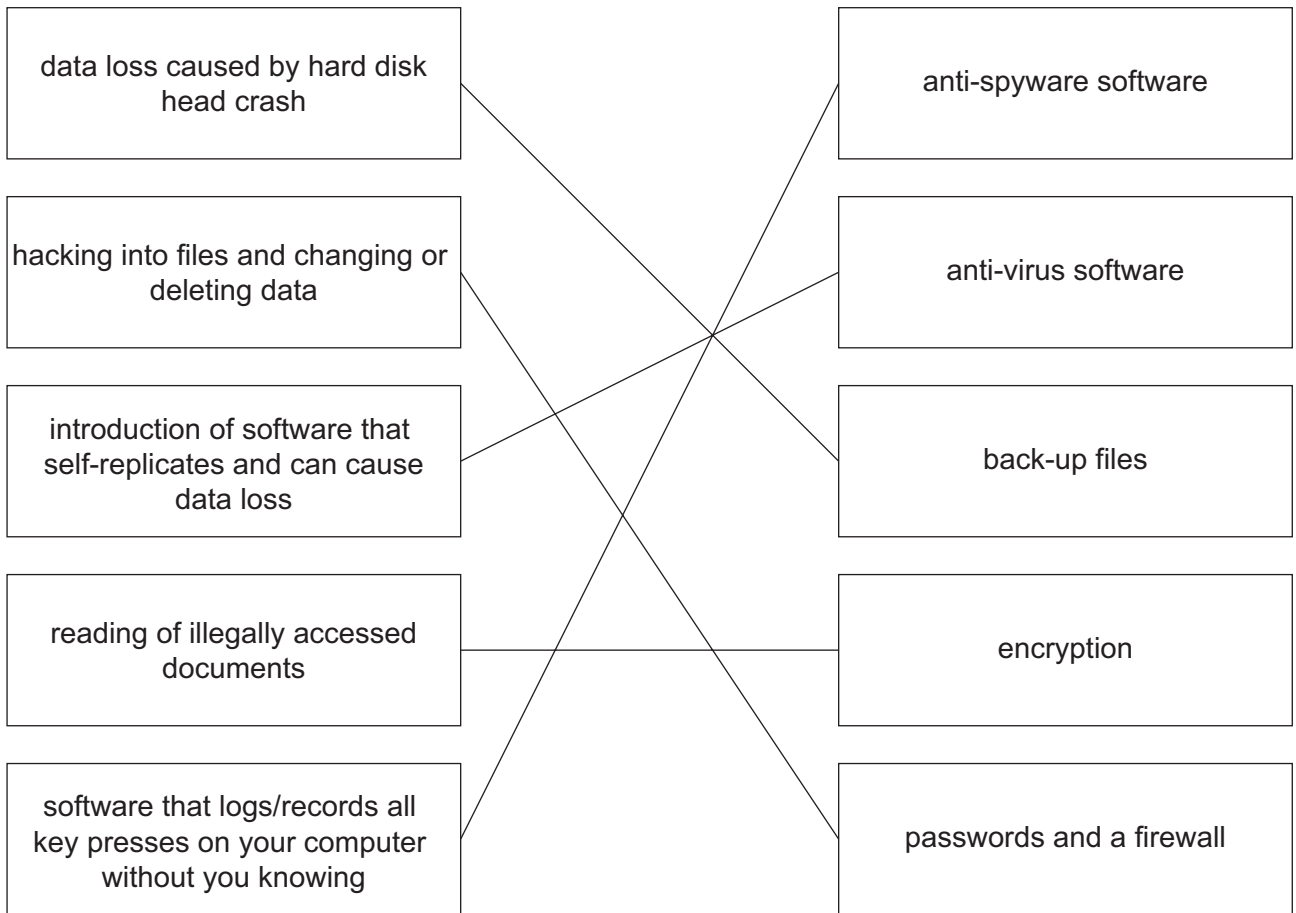1 match – 1 mark   [5]

(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

data loss caused by hard disk head crash	anti-spyware software
hacking into files and changing or deleting data	anti-virus software
introduction of software that self-replicates and can cause data loss	back-up files
reading of illegally accessed documents	encryption
software that logs/records all key presses on your computer without you knowing	passwords and a firewall

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]