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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0478 COMPUTER SCIENCE

0478/11 Paper 1, maximum raw mark 75

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1 (a) 1 mark for each name of application + 1 mark for description of use

Hardware item	Application and how the hardware item is used
Barcode reader	Supermarket checkout – read barcodes to find prices, description – allows automatic stock control Library system – can track books on loan – can link books to borrowers using barcoded cards Airport checkouts – barcodes on luggage to track whereabouts
Microphone	Voice recognition system – allows computer to recognise spoken words and use them as input to, e.g., a word processor Multimedia presentations – allows voice-overs on presentations Video conferencing/VoIP – allows users to speak to each other
Touch screen	Mobile telephone/tablet – allows user to select apps/icons – easy method to input data Ticket/information kiosk – limits the options available for ease of use
Infrared sensor	Burglar/intruder detection system – detects presence of a person by breaking beam/change of temperature Automatic doors – breaking i/r beam allows detection of person approaching door Counting, e.g. people/cars – every time beam is broken it can automatically send data and allow automatic counting

[8]

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(b) Any **two** from:
- Blu-ray discs use blue/violet lasers rather than red lasers as used by DVDs
- storage capacity of Blu-ray discs is much higher than standard DVDs
- Blu-ray discs use one polycarbonate layer; DVDs use two layers
- Blu-ray discs have a built-in secure encryption system

[2]

(c) Any **two** from:
- DVD has one spiral track; DVD-RAM has several concentric tracks
- DVD-RAM can be written to and read from at the same time; DVD-R only allows the read operation to occur
- DVD-R only allows data to be read (can't write to it) whereas DVD-RAM allows reading and writing operation

[2]

2 **(a)** 1 0 1 1 0 1 0 1

F 6 [2]

(b) Any **two** from:
- HTML
- MAC address
- used in assembly language/machine code
- debugging (displays bytes in hex when using memory dumps)

[2]

(c)
- Can represent 16 bit words as only 4 hexadecimal digits
- It is easy to convert hex digits back to binary if necessary [2]

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3 (a)

Statement	True	False
Cookies can destroy or modify data in a computer without the user's knowledge		✓
Cookies generate website pop-ups		✓
Cookies allow a website to detect whether a viewer has viewed specific web pages	✓	

[3]

(b) Registers

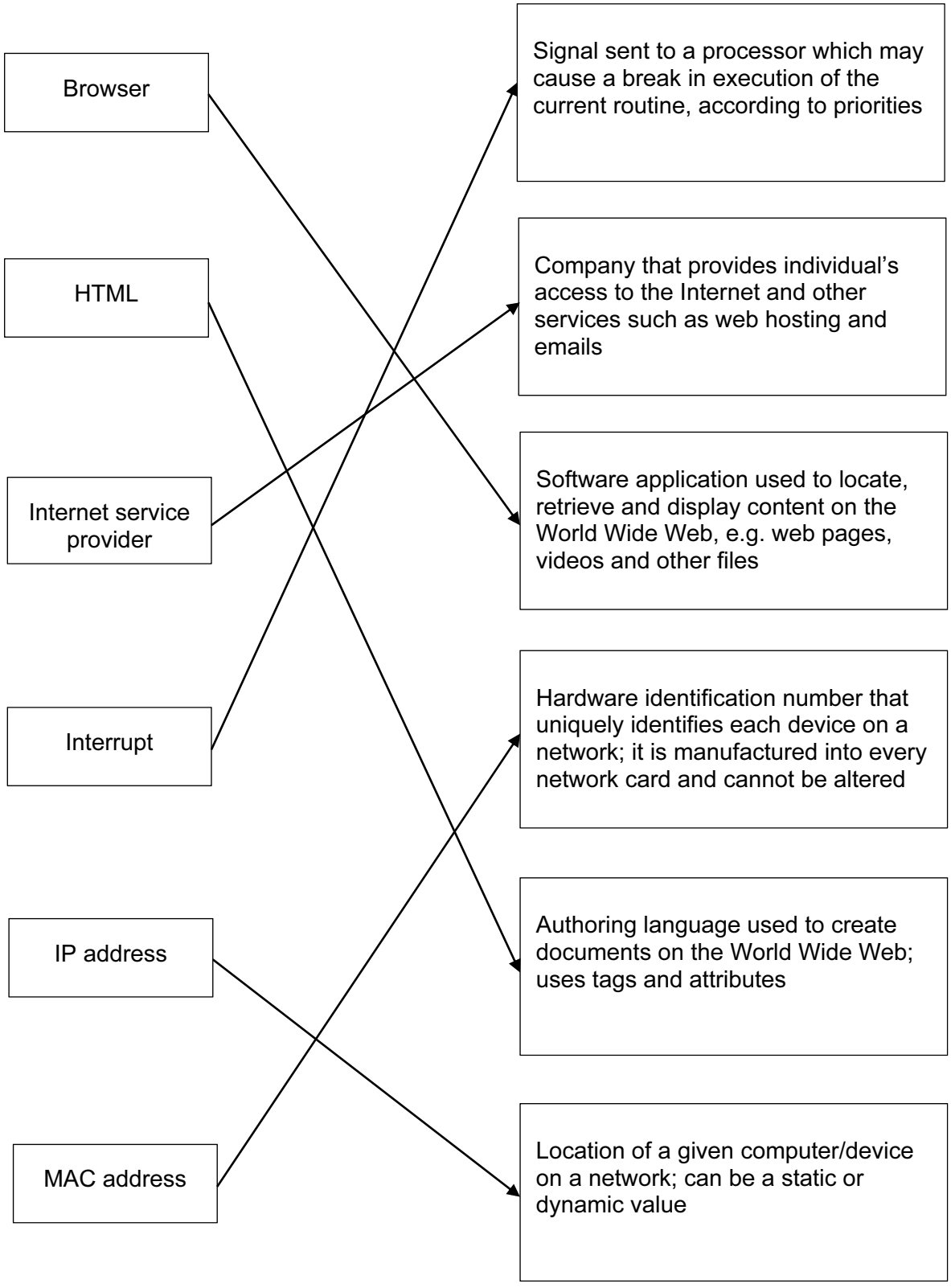
Any **two** from:
– PC (Program Counter)
– MAR (Memory Address Register)
– MDR (Memory Data Register)
– CIR or IR ((Current) Instruction Register)
– ACC (Accumilator)

Buses

Any **two** from:
– control
– data
– address [4]

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4



[5]

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5 (a) (i) Inkjet printer

Any **four** from**:**
- uses cartridges/liquid ink
- makes use of thermal bubble/piezoelectric technology
- sprays ink in droplets on the paper
- uses a moving print head
- suitable for low volume (high quality) output, e.g. a photo

[4]

(ii) Laser printer

Any **four** from**:**
- uses powdered ink/toner cartridges
- uses a (charged) printing drum
- makes use of static electricity charges
- uses a fuser to fix/melt ink onto the paper
- uses a discharge lamp to remove static charge from the drum
- useful for high volume (high quality) output, e.g. leaflets

[4]

(b) Any **three** from:
- produces solid, 3D objects/prototypes
- used in CAD/CAM
- makes use of tomography/slices of an object
- solid built up in thin layers
- uses resin, powdered metal, paper, plastic…

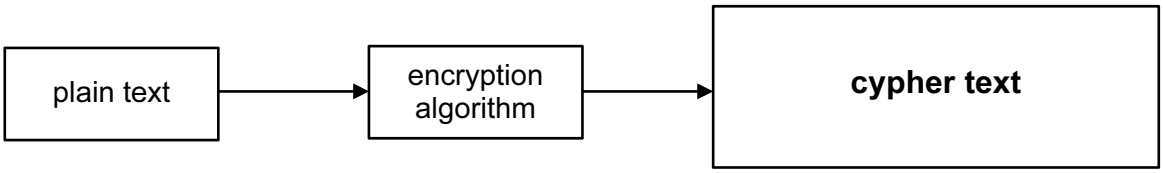
[3]

6 (a) Any **one** from:
- jumbling up/scrambling characters so that message makes no sense
- requires an encryption key to encrypt data
- need decryption key to decipher encrypted message

[1]

(b) Uses the same key to encrypt and decrypt message [1]

(c) 1 mark for correct name in box



[1]

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7 **(a)** Lossy
- when decompressed, some detail is lost and file is not exactly like the original (but difference is usually not noticeable)

Lossless
- when decompressed the original file is restored with no loss of data

[2]

(b) 1 mark for type of file + 1 mark for description
e.g:

- JPG
- Used to store images/pictures

- MP3
- Used to store audio/sound files

[2]

(c) Any **three** from:
- company calculation is based on 1 GByte = 1000 MByte
- so (500 × 1000)/8 = 62 500 files
- customer calculation based on 1 GByte = 1024 MByte
- so (500 × 1024)/8 = 64 000 files
- giving the difference of 1500 files

[3]

8 Any **three** from:
- provides a user interface
- input/output control/handling
- security
- (handling) interrupts
- spooling
- memory management
- processor management
- utilities (e.g. copy, save, delete, rename, etc.)
- maintain user accounts
- load/run software
- error reporting/handling
- multiprogramming
- batch processing/JCL
- multitasking

[3]

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9 (a) Any **one** from:
- verification is being described
- validation is when data follows a set of rules, e.g. length/range/type check

[1]

(b) Any **one** from:
- send as JPEG files
- carry out a file compression first

[1]

10 (a)

w	**w**	**w**	**.**	**c**	**i**	**e**	**.**	**o**	**r**	**g**	**.**	**u**	**k**
%77	%77	%77	**%2E**	**%63**	**%69**	**%65**	**%2E**	**%6F**	**%72**	**%67**	**%2E**	**%75**	**%6B**



1 mark 1 mark 1 mark

[3]

(b)

%77	**%77**	**%77**	**%2E**	**%72**	**%6F**	**%63**	**%6B**	**%69**	**%63**	**%74**	**%2E**	**%63**	**%6F**	**%6D**
W	**W**	**W**	**.**	**r**	**o**	**c**	**k**	**i**	**c**	**t**	**.**	**c**	**o**	**m**



1 mark 1 mark 1 mark

[3]

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11 1 mark for each input device + 1 mark for correct MATCHING reason for each device

Input Devices

– Barcode scanner
– … to scan the barcode on boarding pass/mobile phone screen

– keyboard
– … to key in data in case barcode fails to scan

– (electronic) scales
– … weigh luggage at check-in

1 mark for each output device + 1 mark for correct MATCHING reason for each device

Output Devices

– beeper/speaker
– … confirm barcode read/indicate error if barcode not read

– (LCD) screen
– … select options (e.g. airline) at check-in

– printer
– … produce bag labels

[4]

12 (a)

1	1	1	1	1	0	0	0

0	0	0	0	0	1	1	1

[2]

(b) 1 mark for error detection method and 1 mark for description

– Check sum
– … sum of bits is transmitted and checked against the sum of the received bits

– Check digit
– … a digit that is calculated (e.g. using modulo-11) and transmitted with the data

– ARQ
– … when an error is detected in a packet of data a request is automatically sent for the data to be resent

[2]

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13 (a) Firewall [1]

(b) Shareware [1]

(c) SSL (secure socket layer) (accept HTTPS and TLS) [1]

(d) MIDI [1]

(e) Microphone [1]

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