
COMPUTING

9691/12

Paper 1 Written Paper

May/June 2016

MARK SCHEME

Maximum Mark: 75

Published

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- 1 (a) optical [1]
- (b) Any **two** from: [2]
- a two-way flow of information/data // information studied and then student keys in question answer // communication between
 - between a computer and a user
 - involves real-time feedback
 - software/system that presents choices
 - depending on earlier actions by the user / previous input
- (c) The CD-ROM has a large storage capacity // large number of lessons can be made available
The content cannot be changed / rewritten [1]
- (d) (i) Any **one** from: [1]
- ROM is read only / cannot be written to
 - can't store the user's progress on the CD-ROM
- (ii) Must install onto a device / by example, hard disk – which can be written to [1]
- (e) Any **three** from (max of 2 marks for verification and max of 2 marks for validation) [3]
- Verification:
- visual check on data / for accuracy / consistency ...
 - ... where keyed in data is compared to source data/paper copy
 - double data entry ...
 - ... where data is keyed in twice and compared by computer software
 - when data is transmitted from a source computer to a destination computer.
 - ... the copy of the data is compared – byte by byte – with the original
e.g. checksum / parity
- Validation:
- check that data is reasonable/within criteria/meets the requirements
 - ...include range check, length check, type check, format check (any one)

2 (a) Start at 4 marks and –1 mark for each error [4]

Step	Sequence number
Sensor reading is sent to the microprocessor	3
Microprocessor checks sensor reading against stored temperature value	4
Temperature reading is taken by the analogue sensor	1
If the sensor reading is less than the stored value, the microprocessor sends a signal to switch on the heating	5
Sensor reading is converted into digital using an ADC	2

(b) 1 mark for sensor and 1 mark for reason.

	Sensor	Reason	
(i)	microphone	can detect sound of footsteps, breaking glass,	[2]
	acoustic	can detect sound of footsteps, breaking glass,	
	infra-red	detects movement (broken beam) or heat change	
	pressure	detects weight of person entering building	
	magnetic	detects if a door / window has been opened	
(ii)	light	detects level of ambient light (not “when it gets dark”)	[2]
(iii)	proximity	detects movement	[2]
	infra-red	each time person breaks beam	
	pressure	each time person steps on pressure pad	

Reasons **must** be linked to the sensor type.

3 (a) Any **two** from: [1]

- only one user at a time

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(b) (i) fast data transfer rate [1]

(ii) Any **two** from: [2]

- downloading/streaming on-demand videos/music files
- video/VoIP calls/video conferencing
- download/upload large files e.g. photos
- online gaming
- valid e-commerce examples

(c) Any **two** from: [2]

- allows use of telephone and Internet / multiple devices at the same time
- always “on”/no need to connect each time
- faster data transfer rate (than old dial up systems)

(d) (i) 10 [1]

(ii) 8 seconds [1]

(iii) 800 seconds [1]

(iv) Any **one** from: [1]

- over-capacity on network lines
- computer virus (sending out spurious messages)
- cabling/modem/filter fault
- connection uses copper cable which is a distance from the main telephone switch

4 (a) –1 mark for each error (start at 4 marks) [4]

- 1 **Identification of the problem**
- 2 *Feasibility study*
- 3 *Information collection/Fact finding*
- 4 **Analysis of the problem**
- 5 **Design of the system**
- 6 *Development and testing*
- 7 **Installation of the system**
- 8 **Maintenance of the system**

(b) (i) Any **three** from: [3]

- questionnaires + some description
- interviewing + some description
- observation + some description
- looking at existing documentation + some description

- (ii) 1 mark for name + 1 mark for description [4]
- corrective + some description
 - adaptive + some description
 - perfective + some description

- (c) (i) Any **two** from: [2]

- the processes which make up the system
- the input(s) to a process
- the output(s) from a process
- the flow of data between processes

- (ii) analysis // design [1]

- 5 (a) 1 mark per group of two correct outputs: [4]

INPUTS			Workspace	OUTPUT X
A	B	C		
0	0	0		1
0	0	1		1
0	1	0		1
0	1	1		0
1	0	0		1
1	0	1		1
1	1	0		1
1	1	1		1

- (b) $((A \cdot B) + (B + C)) \cdot C$ [3]
 ((A AND B) OR (B OR C)) AND C
 ((A=1 AND B=1) OR (B=1 OR C=1)) AND C=1
 <-- 1 mark --> <-- 1 mark --> < 1mark >

- (c) Circuit 1 – NOR gate [2]

Circuit 2 – NAND gate

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- 6 (a) [2]
- use of digital video or digital still camera
 - use of optical character recognition (software)
 - compare the symbols with a library of characters.
- (b) (i) touchscreen [1]
- (ii) Any **two** from: [2]
- on entry to car park, date and time stored (e.g. value X)
 - on paying the fee, new date and time stored (e.g. value Y)
 - computer calculates (Y – X)
 - and multiplies number of hours by car park tariff
- (c) (i) Suitable value for 'empty space' [2]
 Nested loop // described for each bay and each row
 Correctly declare and dimension the array
- (ii) YES // or equivalent [1]
- (iii) Any **three** from: [3]
- Nested loop
 Searches one row – then all bays
 Repeat for further row(s), until car registration found
 Output 'Error' if input car registration is not found
- (d) extend the upper bound for the 'bay' / 'row' subscript by one and use subscript 9 to hold a digit for the level (1 to 10). [2]
- OR ...
- Use a 3–D array
 The third subscript is the 'level'
- 7 (i) [2]
- backed up data/files may already have a virus
 - so recovery procedure may re-infect computer
- (ii) Any **two** from: [2]
- a stack operates on 'first-in, last-out'
 - a stack requires only one pointer
 - this is a description of a queue

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(iii) Any **two** from: [2]

- both binary numbers have odd number of 1s (and 0s)
- so they must both have odd parity
- even / odd (denary) values have no bearing on the parity

(iv) Any **two** from: [2]

- broadband sends data as analogue
- each transmission is assigned only a portion of the bandwidth
- allowing multiple transmissions at the same time across the media
- description given is that of baseband

(v) Any **two** from: [2]

- ROM is read only
- buffers use RAM memory
- buffer contents always changing / buffers store data temporarily