CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2012 series

9691 COMPUTING

9691/12 Paper 1 (Written Paper), maximum raw mark 75

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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1 (a) (i) – The physical/electronic components/parts of a computer system [1]
(Do not accept examples)

(ii) – A peripheral device (accept an example)
– to accept data/instructions
– to decode the data (not instructions)
– to transmit it (electronically) to the computer/processor [3]
(Reject interface)

(b) (i) – To type/enter text (reject write)
– to be able to edit/change project/report [1]

(ii) – to store the data collected (allow data by example)
– to extract information // query the data/database/tables
– to organise data [1]

(iii) – to merge/combine text and images
– to produce a front cover (reject poster/flyer/brochure) [1]

(c) – Answers are represented by marks made on paper in particular positions
– Sheet is input/scanned to/by an optical mark reader
– Marks are identified by reflection of light
– reflection from the marks is different to that reflected off the background paper
– converted to digital value
– The reader reports the coordinates of the marks
– The coordinates (accept positions) are compared with a stored (template)
– The number of matches provides the final mark
– mention of timing bars / synchronisation / base coordinates
– Mention of requirement for student placing too many marks / method of correction
– Mention of printing of original answer sheet done in non-reflective ink
(1 per –, max 6) [6]

2 – Knowledge base
– To store all the data/facts about the application
– Rule base
– contains all the rules which the inference engine uses // contains all the rules which are applied to the data
– HCI
– To allow the user to communicate their requirements // the expert system to report the results
[6]

3 (i) – spreadsheet / data logging system / statistical / accounts / database
– to show trends // easier to understand/interpret than numbers
OR
– **e.g.** to show the vital signs of a patient in an intensive care unit
– Allows an immediate interpretation of the present situation as compared to the situation some time ago [2]

(ii) – accept any software package except games
– to keep for future use / to file / to distribute / to write on / to read away from the computer (must imply on paper)
OR
– e.g. to produce a receipt
– to keep for future use / to file (must imply on paper) [2]

4 **(i)** – Software which erases the contents of the whole disk
– The disk surface is divided into tracks and sectors
– The tracks and sectors are checked to ensure that they are fit for holding data // identification of bad sectors
– Initialises FAT/NTFS
– partitioning
– prepare a new disk for use
(1 per –, max 3) [3]

(ii) – Software that can reduce the size of files...
– For example in a text file all the occurrences of common letter combinations can be replaced by a single character
– for example images/music/video /jpeg/mp3/mp4 etc
– lossy/lossless compression
– reduce the size of large documents/files before emailing/storing/uploading them
– to group several files into one file
– decompress to restore original file
(1 per –, max 3) [3]

5 Answers may include:
– program specification
– DFDs
– state transition diagrams
– decision tables
– system flowchart
– Descriptions of the data structures used/variables used // data dictionary
– Algorithms used to produce the solution
– Full listings of annotated code
– Details of modularisation of solution
– Testing procedures
– Test data used, (with results)// results of testing
– Log of revisions/updates
– hardware/software requirements
– known errors/bugs
– I/O designs
(1 per -, max 5) [5]

6 **(a)** – Carries out all arithmetic operations/calculation
– makes logical comparisons/operation (reject decisions)
– opcode sets gates (in ALU to perform correct operation)
– operand is supplied (to ALU) from register(s)/accumulator
(1 per – max 3) [3]

(b) (i) – A temporary storage area [1]

(ii) – A signal sent to the processor (to request service) [1]

(c)
– Data sent to a buffer (from the memory)
– Processor can continue with other tasks while...
– Buffer is emptied to the printer
– When the buffer is empty an interrupt is sent to the processor...
– …from the printer for more data to be sent
– The current job is suspended (and ISR is run)
– to refill the buffer until all data has been sent to the printer
– Credit the concept of interrupt priority
(1 per -, max 4) [4]

7 (a)
– Serial files have records in chronological order // in order of arrival
– Accept: serial files have records in no particular order
– Sequential files have the records arranged in key field (primary key) order [2]

(b) (i) Record will be added/appended to the end of the file [1]

(ii)
– Read file serially, one record at a time
– compare key field with new key
– if new key lower,
– … write new record to new file,
– …else write existing record to new file
– once the new record is written...
– The remainder of the old file is copied to the new file after the new record
– delete old file
– rename new file
(1 per -, max 4) [4]

8 (a) (i)
– Touch screen // key pad // buttons // sensors // joystick
– because space is limited // limited number of input options // built-in // method of control [2]

(ii)
– Speaker/headphones // LCD // screen (ignore touch)
– to output sounds (in order to enhance the action) // to hear/see what is happening [2]

(b) (i) Colour:
– Colour is used to attract users // enhance interest
– Colours should be chosen to maximise contrast…
– …particularly important because of small screen size
– Colours should be used to add realism
– colour to highlight important actions/events
– Avoid colour combinations that may be affected by colour blindness

(ii) Layout:
- make use of the whole screen
- reflects input mechanism // input controls of a sensible size/position
- layout should be consistent
- …e.g. the score should always be in the same place

(1 per -, max 3 per group, max 5) [5]

9 (a) (i)
- Transmission is sent in both directions but only one direction at a time...
- along a single data line / wire (accept one bit at a time) [2]

(ii)
- Transmission can be in only one direction...
- along several data lines/wires //one data line per bit // one byte at a time [2]

(b)
- A set of rules // standard instructions ...
- to govern the transmission/exchange/control of data [2]

(c)
- The received message/packet/data is sent back to the sender
- The message/packet/data that has been returned is compared with the original
- If there are differences then an error has occurred
- message/packet/data is retransmitted
- acknowledgement of message/packet/data correctly received

(1 per –, max 4) [4]

10 (a) (i)

A	**B**	**C**	**D**
0	**0**	0	1
0	**1**	1	0
1	**0**	1	0
1	**1**	1	0

1 mark for both columns correct [1]

(ii) A NOR gate [1]

(b)

A	B	C	D	E	F
0	**0**	**0**	1	1	1
0	**0**	**1**	1	0	0
0	**1**	**0**	0	0	0
0	**1**	**1**	0	0	0
1	0	0	0	1	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	0	0	0

(1 for each bold box) [4]