**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Advanced Subsidiary Level and GCE Advanced Level**

# MARK SCHEME for the October/November 2012 series

## 9691 COMPUTING

**9691/11** 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.

Cambridge will not enter into discussions about these mark schemes.

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.

**1 (a) (i)** Set/group of instructions/program to carry out a task
(Reject non-tangible parts)

**(ii)** The systems software which manages the resources of the computer
-Provides a platform /interface for the user to communicate through [1]

**(iii)** (Applications software) is designed to carry out a task which would have been done even if a computer was not available [1]

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

**(ii)** e.g. To find / search for / research a particular topic from the internet [1]

**(c) (i)** -Temperature sensor takes readings (of the temperature of the chemicals)
-…at regular intervals (over the two hour period)
-Mention of ADC device
-The readings are stored (on a storage device)
-Show the results as graph on (built in) screen
-When the experiment is over the readings are uploaded to a computer [3]

**(ii)** -The readings are placed in a table...
-…probably on a spreadsheet...
-…from where they can be used to produce graphs
-…The presentation software
-…can be used to produce a slide show to present the results to the class
-DTP software
-…to combine text and images
-The prepared graphs can be exported from the spreadsheet to the WP or the presentation software
(1 per -, max 4) [4]

**2** -Knowledge base
-To store all the data/facts about the application

-Inference engine
-To apply the rules in the rule base to the knowledge base

-HCI
-To allow the user to communicate their requirements // the expert system to report the results [6]

**3 (i)** -any application that produces sound e.g. checkout till in a supermarket / playing music / control room warnings
-to report that a barcode has been correctly / incorrectly read justification must match application [2]

**(ii)** -any application that produces animation e.g. to show a representation of the way a volcano works underground in an educational software
-Graphics are easier to understand/actual mechanism cannot be shown
-Justification must match the application [2]

**4** **(i)** -Software that is supplied with a piece of peripheral hardware
-Allows communication between the hardware and the operating system
-Converts commands from one into instructions that the other can carry out
Use: -Allow device to communicate with computer [3]

**(ii)** -Software that is loaded permanently in memory
-It checks the system continually for signs of viruses
-Works in the background
-If an indication is found that a virus is present the file is quarantined
Use:
-Teacher would use it to check files imported by students for viruses
-keep system virus free
-if a virus found it is deleted / quarantined [3]

**5** Answers may include: e.g.
-Contents page/index
-Glossary
-Instructions for installation / how to load / run the software
-Hardware /software requirements
-Instructions for operation / how to save / delete files
-Simple maintenance procedures e.g. how to change devices in the machine
-Error messages and their meaning
-Tutorials
-Contacts for further assistance
-Licence agreement
-Sample inputs / outputs
-FAQs / trouble shooting
(1 per -, max 5) [5]

**6** **(a)** -Manages the execution of instructions
-Fetches each instruction in turn
-Decodes the instructions
-Sends control signals to other parts of the processor to execute instructions
(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 disk drive
-During this process the processor can continue with other tasks
-When full, an interrupt is sent to the processor...
-…from the disk drive…
-for the buffer to be emptied into memory
-The contents of the registers are stored and the buffer is emptied
-When the buffer is empty the processor carries on with other tasks while the disk drive refills the buffer
- Credit the concept of interrupt priority
(1 per -, max 4) [4]

**7** **(a)** -The record / unique key …
-…is subjected to an arithmetic algorithm / calculation...
-…to give the location / address of the record.

**(b)** **(i)** -The keys of two or more records hash to the same value / address [1]

**(ii)** -Use of an overflow area
-Any record that is subject to a collision is placed, serially, in an overflow area
OR
-Use of linked lists
-Original location acts as head of list and points to a list of any records that have been subject to a collision / accept use of a TAG
OR
-The next location after the occupied one is used if it is not yet occupied
-This continues until an empty location is found
(1 per -, max 2 pairs, max 4)
OR
-Use of Buckets
-data stored serially in bucket [4]

**8** **(a)** **(i)** -e.g. Touch screen
-because it has limited options / is a simple user interface
-acts as both an input and an output [2]

**(ii)** -e.g. screen / speaker
-To show directions / to see the options
Output sound warning for incorrect input / verbal instructions [2]

**(b)** **(i)** Content:
-HCI should contain a series of options for the user at each stage
-The screen should contain instructions for use at each stage
-There should always be option available to go back one screen
-There should always be an option to return to the start screen
-There should be a limited amount of choice/information on each screen
-Content should be available in different languages
-Use of sensible icons

**(ii)** Colour:
-Colours should be used consistently…
-…eg red for terminal 1 and blue for terminal 2…
-Reference to colour blindness
-Colours should be chosen carefully to provide a contrast between text and background
Use of particular colour to highlight important information
(1 per - max 3 per group, max 5) [5]

**9** **(a)** **(i)** -Transmission is sent in only one direction...
- Along a single data line/wire (accept one <u>bit</u> at a time) [2]

**(ii)** -Transmission can be in both directions at the same time...
- 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/control the transmission/exchange of data / communication

**(c)** -Each byte has a bit reserved as a parity bit
-The parity is set to be either odd or even throughout the transmission
-The parity bit is set to 0 or 1 in order to make the number of 1s in the byte either odd or even dependent upon which parity has been decided
-If the number of 1s in the received byte does not match the rule then an error has occurred
-(Accept description of Block Check Character if details are correct)
(1 per -, max 4) [4]

**10 (a) (i)** 10.

| A | B | C | D |
|---|---|---|---|
| **0** | **0** | 0 | 1 |
| **0** | **1** | 0 | 1 |
| **1** | **0** | 0 | 1 |
| **1** | **1** | 1 | 0 |

1 mark for both columns correct [1]

**(ii)** NAND gate [1]

**(b)**

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

(1 for each bold box) no follow through [4]