UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers

9691 COMPUTING

9691/12 Paper 12 (Written Paper 1), maximum raw mark 90

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1 (a) (i) -e.g. To transfer work from home to school/take backups of system
-small/portable/works with any computer/stores a lot of data [2]

(ii) -e.g. To import software/to make backups of data on system/encyclopaedias/films
-large capacity/fast access times/can be used many times/re-writeable [2]

(iii) -e.g. To play music while working/encyclopaedias/to import software
-Compatible with form of albums/large storage capacity/can not be altered [2]
(Note: Accept any sensible application)

(b) -hard drive
-to store data files/software/operating systems [2]
(Note: Other storage may be justified but the question states 'need')

2 (a) (i) Software that manages the computer hardware/allows applications to run

(ii) General purpose software/carries out a number of tasks/that would have to be done
even if there was no computer.

(iii) Software used to convert a program of instructions from one language to another

(iv) Part of O.S. which carries out a commonplace task/housekeeping.
(1 per dotty, max 4) [4]

(b) -Many of the processes will be dangerous...
-many of the processes will be complex
-and must be supervised in real time...
-information must be immediately available
-Small number of operators and...
-there will be a large amount of information...
-which must be prioritised...
-to avoid information overload.
-Some less important data...
-e.g. relating to non time crucial processing
-should be kept for later at non busy time
-Use of priority symbols like colours/inverse video/flashing/sound alarms...
-should be minimised because overuse causes reduction in effect.
-Use of graphics to illustrate processes and effects of parameters on processes
(1 per -, max 6) [6]

3 (a) (i) The characters that a system can recognise/characters on the keyboard [1]

(ii) -Each character assigned a unique binary code...
-Known as a byte/Typically 8 bits
-lower case/upper case in separate orders to allow alphabetic order
-One bit reserved for parity check.
-Meaning 128 characters can be represented
-Extended ASCII uses all 8 bits for characters, ignoring parity
(1 per -, max 3) [3]

(b) (i) Check input to ensure it is sensible/follows set rules for data [1]

   (ii) -Type check/character check
       -Ensure characters are all letters
    -Length check
     - >1 and <20 (e.g.) characters entered
    -Existence check
      -Compare with file to see if there is this name there
    (1 per -, max 2 pairs, max 4) [4]

(c) 10000111
   (1 per nibble) [2]

(d) -Multiply 250 and 10000
   -Add 10%
   -Signify that should divide by 1024...
   -Twice
   -Answer between 2.35 and 2.75
   -M bytes
   (1 per -, max 5) [5]

(e) (i) -To keep track of numerical/currency values
    -and do automatic calculations
    -e.g. calculate fines/membership fees/library accounts
    (1 per -, max 2) (keep records of books/borrowers) [2]

   (ii) -To create slide shows for public performance
    -Allows use of sound/video/animation/...
    -e.g. to present lessons about famous authors to parties of school children
    (1 per -, max 2) [2]

   (iii) -To produce personalised letters/documents...
    -by searching file for data and inserting into standard document
    -e.g. Producing letters to members who have outstanding books
    (1 per -, max 2) [2]

4 (a) (i) Advantages:
   -Hardware can be shared making system cheaper to set up
   -Software can be shared making system cheaper to set up
   -Hardware and software can be shared making it possible to provide more unusual items
   -Any machine can be used for all information
   -Software installation made easier
   -More easy to manage/control/maintain
   -communication is easy between the machines
   (1 per -, max 3)
   Disadvantages:
   -Data is not as secure as when stored on stand-alone machines
   -Can be bottlenecks when peripherals are used e.g. using a shared printer.
   (1 per -, max 1) [4]

    (ii) -If data being communicated is to be stored at receiver for future use, then the bit rate can be slow

    -If data being communicated is to be used immediately upon arrival then the bit rate used for communication must be faster than the rate at which the data is used.

    -bit rate is the number of bits per second [2]

    (b) -Modem
-to link LAN to communication medium
-Gateway/Router
-to connect two different networks together
-Firewall
-to protect LAN from unwanted access
-proxy server to allow one Internet connection for whole network
(1 per -, max 4) [4]

5 **(a)** -Off-the-shelf is a generally available package
-Custom-written is specially produced for the problem solution [2]

    (b) -Ready tested/Bug free
-Immediately available
-Training available
-Staff who can use it are available
-Cheaper because of shared development cost.
-compatible with other software
(1 per -, max 3) [3]

6 **(a)** -Iteration means to repeat a series of steps
-in a given sequence
-The steps and the sequence are shown/it is not possible to depart from the sequence
-The sequence can be entered at any point
-Steps can be repeated as often as is necessary.
(1 per -, max 3, accept answer formed around the stages on the diagram) [3]

    (b) -Is solution technically feasible?
      -e.g. Does the hardware exist to automatically identify a student?
-Is the solution economic to produce?
      -e.g. Will the extra costs make the food more expensive?
-Is the solution economic to run?/Will it cut costs in the cafeteria?
      -e.g. Will we need to employ more people, hence increasing costs?
-What will the social implications be?
      -e.g. Will the new system cater for the disabled students?
-Is the skill level among staff high enough?
      -e.g. Will the cafeteria staff have to do a training course?
-Time constraints
      -e.g. The changeover must be finished by the end of a holiday
(1 per -, max 3 pairs, max 6) [6]

7 (a) (i) -Card has a strip of magnetic material...
-which holds data
-in this case student ID number
-Read by swiping through a card reader.
(1 per -, max 2)

(ii) -Is only activated by input of PIN at number pad...
-which is stored in computer system, not on card / is stored on (one of the other two areas of the) magnetic stripe
-photo ID on card
-Ability to freeze account so items cannot be charged to it
(1 per -, max 2) [4]

(b) -Staff can inspect their own data...
-at any time...
-in order to check its accuracy
-Access to data limited to small/named number of people...
-Password/Physical security
-Data up to date and accurate
-Data erased when no longer needed
-Only relevant data for this example is stored.
(1 per -, max 6) [6]

(c) (i) -Data is collected
-Processing carried out at quiet time
-Probably with no human intervention
-Process is not time critical
-Preparation of monthly statements
(1 per -, max 2) [3]

(ii) -Real time
-Customer requires result as soon as data has been input [2]

(d) E.g.
-Report of popular/unpopular food items...
-provided by the cumulative totals of orders made
-Report on times that are popular among students/staff...
-provided by mean total takings against time
(1 per -, max 2) [2]

8   INPUT NO_OF_SNACK
LET PRICE = ARRAY (NO_OF_SNACK)
OUTPUT PRICE
REPEAT
        INPUT COIN
        IF COIN = 1 THEN PRICE = PRICE-1
            ELSE PRICE = PRICE -5
        ENDIF
        OUTPUT PRICE
UNTIL PRICE < = 0
DISPENSE PRODUCT
IF PRICE < 0 THEN REPEAT
                            DISPENSE 1 CENT COIN
                            PRICE = PRICE + 1
                UNTIL PRICE = 0
ENDIF
END

Mark Points:
-Input snack number
-Find price in array
-Output Price (here AND in the first Repeat loop)
-REPEAT... UNTIL PRICE < = 0 (or equivalent if a flow diagram Not a For)
-Input coin (inside loop)
-Condition of coin and then calculate price
-Dispense Product
-Condition for negative price
-Loop to give change with correct condition
-Only give 1 cent coins in change
-Correct layout and end conditions
(1 per -, max 9)   [9]