CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 series

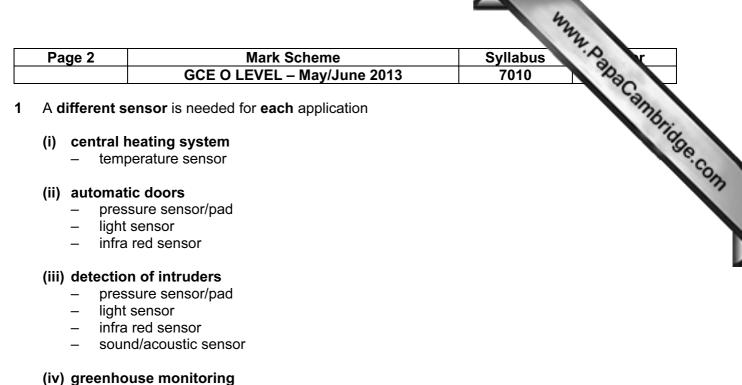# 7010 COMPUTER STUDIES

7010/11   Paper 1, maximum raw mark 100

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 May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

1 A **different sensor** is needed for **each** application

   (i) central heating system
   – temperature sensor

   (ii) automatic doors
   – pressure sensor/pad
   – light sensor
   – infra red sensor

   (iii) detection of intruders
   – pressure sensor/pad
   – light sensor
   – infra red sensor
   – sound/acoustic sensor

   (iv) greenhouse monitoring
   – temperature sensor
   – moisture/humidity sensor
   – light sensor
   – pH sensor
   – CO_2/O_2 (levels) sensor   [4]

2 **1 mark** for name of loop structure + **1 mark** for correct loop structure including initialisation + **1 mark** for correct input inside loop:

   for (… to … next) loop

   example: **for** x = 1 **to 10**
                 input number
            next x

   repeat (… until) loop

   example: c = 0
            repeat
              input number
              c = c + 1
            until c > 9 (or equivalent)

   while (… endwhile/wend) loop

   example: c = 0
            while c <> 10 **do**
              input number
              c = c + 1
            endwhile

                                                                    [6]

(3) (a) **2** marks minus **1** for each error.

activity	Yes	No
chat rooms		✔
cookies		✔
pharming	✔	
virus	✔	
VoIP		✔

[2]

(b) 1 mark per description

chat rooms
– place for online conversations
– use instant messaging
– to allow communications in real time
– users register and choose user name and password
– log onto enter chat room using user name and password
– list of people currently in room will be alerted as soon as new person enters room

cookies
– small files sent to user's computer when visiting a website
– stores information about user which is accessed every time user visits that website
– lets website know who you are/past visitor

pharming
– malicious code installed on a user's computer/web server
– misdirecting the user(s) to a bogus/fake fraudulent website
– can use domain name poisoning

virus
– programs that replicate themselves
– designed to disrupt computer system
– delete/alter/corrupt files

VoIP
– Voice over Internet Protocol
– system that allows user to talk to another user using the Internet
– can use USB phone or head set (microphone and headphones)
– requires fast broadband connection to work
– can also combine with webcam and instant messaging   [5]

(4) (a) (i) ring

(ii) star

(b) 1 mark for benefit and 1 mark for drawback

benefit
– share resources such as hardware e.g. printer, software
– **easier** to monitor what users are doing
– **easier** communication between users

drawback
– **greater** risk of viruses
– **greater** security risk (such as hacking)
– expensive hardware such as servers, cabling, …
– needs management   [2]

(c) 1 mark for LAN feature and 1 mark for WAN feature

LAN
– used over a small geographic area (e.g. one building)
– doesn't require external telecommunication

WAN
– used over remote/vast geographic area (e.g. continents)
– needs modem, external phone lines, microwaves…   [2]

5 1 mark for each correct device

application	hardware device
automatic stock control system in a supermarket	barcode **reader/scanner/EFTPOS** terminal
keeping track of the live stock on a large farm	barcode/RFID/microchip **reader**
input data into a computer using speech recognition	microphone

[3]

6

generating intermediate frames between two images to give the appearance of movement		morphing

special effect that changes one image into another image (e.g. the special effect of a person slowly turning into an alien)		rendering

generating a final completed 3D image from a given 2D model by the use of software		tweening

very simple drawing made up of lines, circles and dots used to depict a character (e.g. a human being)		key frames

variable controlling the position of part of an animated character (e.g. control changes in a facial expression)		stick figure

drawings that define the starting point and end point of any smooth transition in animation		avar

[5]

7 **1** mark for each correct term.

   (i) verification

   (ii) interrupt   [1]

   (iii) handshaking   [1]

   (iv) (printer) buffer, RAM   [1]

   (v) checksum   [1]

(8) **(a)** Any **three** features from:
- road map and satellite views
- superimpose road map and satellite images
- ability to zoom in and zoom out
- arrow keys to move N, S, E and W
- detailed directions to get from customer's home to the house
- ability to use street name, post code, zip code (etc.) in searches
- "pins" to show exact location of house on the map/hotspot
- local amenities e.g. post office, school etc.
- scale/conversion of miles to kilometres   [3]

   (b) **(i)** virtual reality   [1]

      (ii) Any **three** from:
- zoom in and out
- buttons to navigate between rooms/enter the tour
- arrow keys to rotate through 360º
- print out of rooms
- save houses visited as "favourites"
- choice of area within house to view   [3]

(9) **(a)** Any **three** from:
- knowledge base
- inference engine
- rule(s) base
- (expert system) shell
- explanation system   [3]

   (b) Any **two** from:
- yes/no type of questions
- multiple choice questions
- explanations/examples   [2]

10 (a) (i)

A	B	X	
0	0	1	} 1 mark
0	1	0	
1	0	0	} 1 mark
1	1	0	

[2]

(ii) NOR gate (allow follow through from part (i))   [1]

(b) (i)

A	B	C	X	
0	0	0	0	} 1 mark
0	0	1	1	
0	1	0	0	} 1 mark
0	1	1	1	
1	0	0	0	} 1 mark
1	0	1	1	
1	1	0	0	} 1 mark
1	1	1	1	

[4]

(ii) input C only   [1]

11 (a)

row	value	
1	255	} 1 mark
2	192	
3	96	} 1 mark
4	48	
5	96	} 1 mark
6	192	
7	255	} 1 mark
8	0	

[4]

(b)   128 64 32 16   8   4   2   1

[4]

12 (a) 7

(b) KO, OS, SN

(–1 mark for each error) [2]

(c) (**Share price ($)** < 50.00)   OR   (**Profits (billion $)** > 8.0)

< - - - - - (1 mark) - - - - -> < - - - - - - - (1 mark) - - - - - - - >

(**Profits (billion $)** > 8.0)   OR   (**Share price ($)** < 50.00)

< - - - - - (1 mark) - - - - > < - - - - - - - (1 mark) - - - - - - - > [2]

13

```
                    ( START )
                        |
                     [ X = 0 ]
                        |
                        |<-----------------------------+
                        v                               |
   ( END )        / INPUT 8-  /                         |
      ^          /  digit id /                          |
      |         /_____/                           |
      |               |                                 |
      |               |            1 mark               |
      |               v                             [  11  ]
   /  10  /  Yes    /  \                                ^
  /_____/ <------ <  9 >              11  1 mark       |
      ^             \  /                                |
      |              |                                  |
      |              | No                               |
      |              v                                  |
      |           /     \     Yes                       |
      |          <  8/3  > -----------------------------+
      |           \     /                               ^
      |              |                                  |
      |              | No                               |
      |              v                                  |
      |           /     \     Yes                       |
      |          <  3/8  > -----------------------------+
      |           \     /        1 mark
      |              |
      |              | No
      |              v
      |           [  5  ]
      |              |
      |              v
      |          /  7  /           1 mark
      |         /_____/
      |              |
      |     Yes      v
      | <--------- /   \
      |           < 4  >
      |            \   /
      |              | No
      |              v
      |           [  6  ]           1 mark
      |              |
      |              v
      |       / INPUT 3       /
      |      / characters from /
      |     /  password       /
      |              |                1 mark
      |     Yes      v        No
      +----------- / 2 \ ---------> [  1  ] ----> ( END )
                    \ /
```

[6]

14 (a) Any **two** from:
  – if all computers 'agree' system works automatically
  – if one computer fails, there are still 2 working
  – if one computer is faulty, use "majority output" to make decisions
  – increases passenger confidence in the system   [2]

  (b) Any **four** points from:
  – sensor readings are taken (continuously)
  – these are converted to digital (using ADC)
  – data/signals sent to the computer
  – the computer compares the data received with stored values/computer interprets signals
  – if outside acceptable range, computer sends signals
  – signals converted to analogue (using DAC)
  – fuel to engines is increased/decreased to control aeroplane speed
  – if one computer gives a different signal, a warning message is sent   [4]

  (c) (i) Any **three** points from:
  – satellite sends/broadcasts signals to earth
  – GPS system uses satellite signals to calculate position of aeroplane
  – …..data from at least three satellites needed to calculate this position
  – satellites use atomic clocks to ensure very accurate timing
  – each satellite transmits data giving its position and time
  – computer compares calculated position supplied by GPS system with flight path …
  – … if aeroplane off course, then computer sends signals …
  – … and rudder settings are changed (using motors) to control direction
  – if aeroplane is on course, no action is taken
  – direction checking is carried out continuously   [3]

  (ii) **1** mark for benefit and **1** mark for drawback

  benefit
  – estimate time of arrival at destination/remaining flight time
  – location of alternative airports in case of emergency
  – more accurate flight path maintained
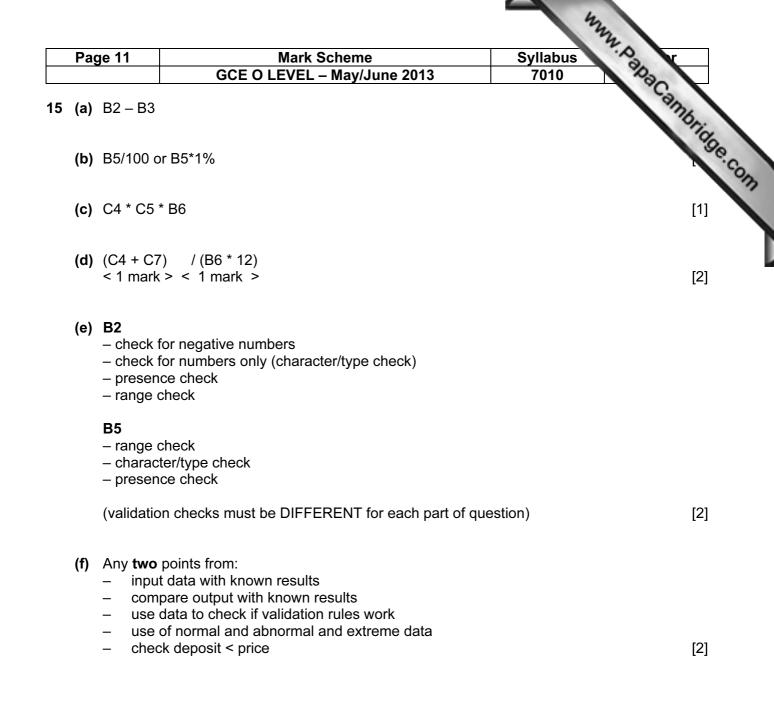 – more efficient fuel costs since fewer course corrections are made

  drawback
  – if weather is bad, GPS and computer won't automatically "steer around the problem"
  – loss of satellite signal could lead to wrong direction/decision making   [2]

15 (a) B2 – B3

(b) B5/100 or B5*1%

(c) C4 * C5 * B6   [1]

(d) (C4 + C7)   / (B6 * 12)
     < 1 mark > < 1 mark >   [2]

(e) B2
    – check for negative numbers
    – check for numbers only (character/type check)
    – presence check
    – range check

    B5
    – range check
    – character/type check
    – presence check

    (validation checks must be DIFFERENT for each part of question)   [2]

(f) Any **two** points from:
    –   input data with known results
    –   compare output with known results
    –   use data to check if validation rules work
    –   use of normal and abnormal and extreme data
    –   check deposit < price   [2]

16 **marking points:**
   – set total of barcodes entered correctly to zero (initialisation, e.g. match = 0 below)
   – input 100 numbers (correct loop structure)   1
   – input 5 digits of the barcode (a, b, c, d and e) INSIDE **a** loop   1 ma
   – find total value using barcode formula given   1 mark
   – method for finding remainder   2 marks
     (e.g. subtract 10 from total (1 mark) using a loop (1 mark) until total < 10)
   – finding out how many correct barcodes were input   1 mark
   – correct output (OUTSIDE loop – must have a loop to get mark)   1 mark

   example of suitable coding:

   match = 0
   1 mark

   for number = 1 **to** 100   1 mark

       input a, b, c, d, e   1 mark

       total = (a * 3) + (c * 3) + (b * 2) + (d * 2)   1 mark

       repeat

           total = total – 10   2 marks

       until total < 10

       if total = e **then** match = match + 1   1 mark

   next number

   print match   1 mark

                                                                                             [5]