UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

7010 COMPUTER STUDIES

7010/12 Paper 12, maximum raw mark 100

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) buffer

Any **two** points from:
- temporary …
- … storage/memory
- compensates for the difference in speed of peripherals and CPU
- e.g. printer (buffer) [2]

(b) batch processing

Any **two** points from:
- processing doesn't start until **all** data is collected
- JCL (any *reference to Job Control Language)*
- no need for user interaction
- processed all in one go
- done at "quiet" times
- e.g. billing, payroll, cheque processing [2]

(c) e–commerce

Any **two** points from:
- electronic commerce
- buying and selling products/services …..
- ….. using the internet/computer networks
- reference to B2B (business to business) or B2C (business to consumer/customer)
- e.g. on-line shopping, commodity exchanges, Internet/online banking [2]

(d) simulation

Any **two** points from:
- studying the behaviour of a system
- by using a model/mathematical representation
- results can be predicted
- e.g. flight (or other) simulator, modelling hazardous chemical processes
- e.g. 10-pin bowling computer game [2]

(e) email

Any **two** points from:
- electronic mail
- sending messages from one device to another using computer networks/Internet
- world wide form of electronic communication
- can send file attachments
- e.g. sending a letter without use of traditional mail service [2]

2 **(a)** Any **three** points from:
- loss of jobs/unemployment
- deskilling
- need to re-train
- different jobs available/re-skilling
- no longer need to do hazardous/tedious jobs [3]

(b) Any **two** points from:
- lower work force costs (no salaries to pay)
- lower environmental costs (less electricity for heating/lighting)
- higher throughput
- more consistent product
- robots don't need breaks, holidays/work 24/7 etc.
- robots don't take industrial action [2]

(c) Any **one** point from:
- tasks repeated by skilled worker and how each task is done is memorised
- tasks programmed directly into the computer/robot memory [1]

(d) Any **one** point from:
- if parts missing for a sequence, then a warning should be given and the assembly stopped
- several quality control stages to spot an error early on
- program in checks at each stage of assembly so robots can detect a fault immediately [1]

3 Any **four** points from:
- understand the current system
- produce data flow diagrams/system flowchart
- identify user/client requirements/objectives
- interpret user/client requirements/objectives
- agree requirements/objectives with the user/client
- collect data from the current system
- fact finding (e.g. questionnaires, interviewing, etc.)
- problem identification [4]

4 Any **four** features from:
- data must be up to date
- data can only be read/used for the purpose for which it was collected
- data must be adequate, relevant and not excessive
- data must be accurate
- data must be destroyed when no longer needed/don't keep longer than necessary
- data user must register what data stored
- data must be used/collected fairly and lawfully
- data must be held securely
- data must be protected from accidental damage
- only authorised personnel can have access to the data
- fines are imposed for data mis-use
- data should not be passed on to a third party without permission
- a person can view data and have it changed/removed if incorrect
- safe harbour (countries with DPA at least as good) [4]

5 **(a)** 1 mark each for 2 concerns
OR 1 mark for concern + 1 mark for expansion:

- customer goes online in a public place …..
  …… and is overlooked as they enter id/password/PIN
- customer receives emails taking them to a false site …..
  ….. where they are asked to confirm details by entering them
- customer downloads virus, spyware, …..
  ….. which logs all key presses including id/password/PIN [2]

(b) Any **two** points from:
- don't need card number for online transaction/card number already
- online user is anonymous/not visible
- online the customer does not need the card and signature/PIN [2]

(c) Any **two** points from:
- secure sites using encryption
- use of passwords/PINs/biometrics/advice to change PIN regularly
- no communications with customer requiring personal details
- use of home card readers that generate codes known only to bank and customer
- check with customer at each log on when they were ***last*** logged on to the website
- contact customer if unusual transaction/random check
- customer asked to inform bank if intending to use card in another country
- customer asked to inform bank if card lost/stolen
- ensure firewall is in place [2]

6 **(a)** Any **four** points from e.g.:
- gather information from experts/questionnaires
- create the knowledge base
- type/put information into computer
- create rules/rules base
- create/design inference engine
- create/design input–output interface
- fully test the system
- expert system learns [4]

(b) **(i)** Any **one** point from:
- 3D visual world
- uses computer simulation
- uses special interface devices (e.g. data gloves and goggles) [1]

(ii) Any **one** point from:
- data gloves/goggles (if not given credit in part **(i)**)
- hardware/motors to provide movement
- special suits fitted with sensors [1]

7 **(a)** Any **four** improvements from:
- use (text) boxes for
  - *names*
  - *addresses*
  - *sex*
  - *date of birth*
  - *subjects*
  - *grades*
- separate fields into separate entry items
  - *name* into *first name* and *last name*
  - *address* into *street*, *city* etc
- drop down list/combo box for
  - *date of birth*
  - *sex*
  - *subjects*
  - *grades*
- calendar object for
  - *date of birth*
- radio buttons for
  - *sex*
- hyperlinks for
  - *NEXT*
  - *BACK*

[4]

(b) **(i)** **any one** point from:
- check on input for errors by double entry
- on screen checking
- check input is same as source

(ii)
- name
- address

[3]

8 **(a)** Any **two** points from:
- barcode is scanned/keyed in
- barcode is validated (by check digit)
- system looks up barcode in computer files/database
- retrieves (and returns) price

[2]

(b)

if stock level ≤ minimum stock level	**3**
report printed out for manager	**5**
stock level reduced by 1	**1**
new stock value written back to file	**2**
more items are ordered automatically	**4**

1 mark for each correct answer up to max of 4.
4 marks for **all** 5 correct
3 marks for **any** 3 or 4 correct
2 marks for **any** 2 correct
1 mark for **any** 1 correct

[4]

9 (a) Any **two** correct input devices
OR input device + correct type of screen

– mouse/trackerball + CRT screen/TFT screen
– touch screen + CRT screen/TFT screen
– light pen + CRT screen [2]

(b) Dot matrix printer:
Accept a max of 2 advantages **and** a max of 2 disadvantages:

Advantages:
– suitable for dirty/dusty/damp atmospheres
– cheap to maintain
– cheap to run
– can operate with continuous/multipart stationery

Disadvantages:
– poor print quality
– very noisy
– very limited colours [3]

Inkjet printer:
Accept a max of 2 advantages **and** a max of 2 disadvantages:

Advantages:
– inexpensive to purchase
– high quality printouts
– can use colours
– supported by most operating systems
– quiet

Disadvantages:
– run out of printing ink quickly/cartridges run out quickly
– price per page/inks are expensive
– not suitable for dirty/dusty/damp atmospheres [3]

10 (a) Award marks as shown (each block = 1 mark):

	D	E
1	**Total cost ($)**	**Average cost per month ($)**
2	= B2 * C2	= D2 / 5
3	= B3 * C3	= D3 / 5
4	= B4 * C4	= D4 / 5
5	= B5 * C5	= D5 / 5
6	= B6 * C6	= D6 / 5
7	= B7 * C7	= D7 / 5
8	= AVERAGE (D2 : D7) Alternative answers: = SUM(D2:D7)/6 = (D2+D3+D4+D5+D6+D7)/6	= AVERAGE (E2 : E7) Alternative answers: = SUM(E2:E7)/6 = (E2+E3+E4+E5+E6+E7)/6 = D8/5

[4]

(b) (i) (A1 : A7) and (C1 : C7)
(1 mark) (1 mark) [2]

(ii) Any **one** point from:
- add an extra column and set all values to 2.08
- draw a line at value 2.08 on the graph
- add a trend/average line using spreadsheet software [1]

(c) D6, E6, C8, D8, E8 (-1 mark for each error or omission) [2]

11 (a) E, H [2]

(b) (**Engine (litres)** > 1.8) **OR** (**CO_2 (g/km)** > 150)
← (1 mark) → ← (1 mark) →
Or
(**CO_2 (g/km)** > 150) **OR** (**Engine (litres)** > 1.8)
← (1 mark) → ← (1 mark) → [2]

(c) G, C, D, B, F, A, E, H
(1 mark for correct order (fuel used)
1 mark for *ascending* order) [2]

12 (a) Any **two** items from:
- webcams/digital video camera
- microphones
- broadband modem
- networking hardware e.g. cabling/router
- loud speakers/headphones [2]

(b) Any **two** items from:
- communications software
- CODEC/compression software
- Internet access software
- driver software (for the hardware in part **(a)**)
- echo cancellation software [2]

(c) Any **two** problems from:
- poor reception (poor sound, jerky screen images)/network failure
- if more than 2 conference locations, can be difficult controlling meeting
- time zones
- language difficulties
- power failure [2]

13 Expected output:

1
2
Error [3]

14 (a) Any **one** from:
- infra-red
- light
- radar
- ultrasonic / proximity [1]

(b) Any **four** points from:
- signal sent out from vehicle **A**
- sensors pick up reflected beam
- signal converted to digital by ADC
- computer uses data to calculate how close vehicle **B** is
- computer uses speed of vehicle **A** …..
- ….. to determine the ***safe distance***
- if the ***safe distance*** > distance between the two vehicles …..
- ….. then the driver is warned
- sends signal to (actuators) apply brakes
- *reference to need for DAC*
- monitoring continues endlessly unless system deactivated

  ** no marks for computer applies the brakes*
  ** no marks for computer senses ….*
  ** no marks for sensor taking any actions* [4]

(c) Any **two** points from:
- when roads are busy, constantly braking
- system may not take road conditions into consideration
- over-reliance on system by the driver
- only works properly if vehicle has an automatic gearbox
- sensors don't work if obstructed/dirty/malfunction [2]

15 *LEFT 90*
PENDOWN
FORWARD 10
RIGHT 90
———————
FORWARD 10
PENUP
FORWARD 10
PENDOWN
———————

FORWARD 20
RIGHT 90
FORWARD 20
RIGHT 90
FORWARD 20
———————
LEFT 90
FORWARD 20
PENUP / RIGHT 90
———————

20 RIGHT 90/PENUP
FORWARD 10
PENDOWN
———————
FORWARD 10
RIGHT 90
FORWARD

(**NOTE**: the second sequence of instructions could be done with a REPEAT loop i.e. REPEAT 2
FORWARD 20
RIGHT 90
ENDREPEAT
FORWARD 20

It is also possible to write:
REPEAT 3
FORWARD 20
RIGHT 90
ENDREPEAT

followed by LEFT 180 or RIGHT 180 instead of LEFT 90) [5]

16 (a)

total = 0	(1 mark)	*initialisation*
for x = 1 **to** 50	(1 mark)	*correct loop*
input number	(1 mark)	*correct input **and** output*
if number > 100 **then** total = total + 1		(1 mark)
		count numbers>100
next x		
output total		

(1 mark for initialising total)
(1 mark for correct loop – accept **repeat** loop or a **while** loop)
(1 mark for correct input (within loop) **and** output (after the loop))
(1 mark for counting how many input numbers were > 100) [3]

(b) total = 0 (1 mark) *initialise total*

for x = 1 **to** 100 (1 mark) *correct loop*

input number (1 mark) *correct input **and** output*

total = total + number (1 mark) *finding sum of numbers*

next x

average = total/100 (1 mark) *calculate average*

output average

(1 mark for initialising total)
(1 mark for correct loop – accept **repeat** loop or a **while** loop)
(1 mark for correct input (inside the loop) **and** output (after the loop))
(1 mark for calculating total)
(1 mark for calculating the average outside the loop) [3]