UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

7010 COMPUTER STUDIES

7010/12 Paper 1, maximum raw mark 100

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) check digit

– validation check
– single digit appended to a number
– calculated from digits and their position
– re-calculated after data transfer

– e.g. bar codes, ISBN, credit/debit cards [2]

(b) RAM

– random access memory
– memory lost on switching off/volatile/temporary
– stores user programs/data (etc.)
– usually on a chip
– can be read/changed by user

e.g. SRAM,DRAM etc. [2]

(c) macro

– macro instruction
– new command created by combining number of existing ones
– can combine effects of pressing several individual keys on k/board
– can be programmed by user to customise software
– e.g. single key stroke to insert a logo into a document [2]

(d) USB flash memory

– (memory data) storage device
– removable/portable
– uses universal serial bus connector
– re-writable device
– contains printed circuit board
– allows transfer of data/files between computers
– draws power from the computer port
– contains EEPROM (electrically erasable programmable ROM)/ non-volatile memory
– e.g. pen drive/memory stick/thumb drive

[2]

(e) printer buffer

– temporary storage/memory
– compensates for the difference in speed of printer and CPU
– e.g. holds data whilst computer completes a job, recovering from error (e.g. paper jam)

[2]

2 **(a)** Any **three** from:
- "glitches in the software" e.g. divide by zero
- software conflicts
- virus
- operating system software loss/corruption
- hardware malfunction (e.g. overheating of circuit board, processor fans failing etc.)
- hardware incompatibility
- power supply interruption/"spikes"
- incorrect power down after use
- hard disk crash/failure

[3]

(b) Any **one** from:
- Grandfather-Father-Son (GFS)/file generation system
- backups
- parallel systems
- type/scan and OCR in new data again from the hard copies [1]

(c) Any **one** from:
- encryption
- encrypt files

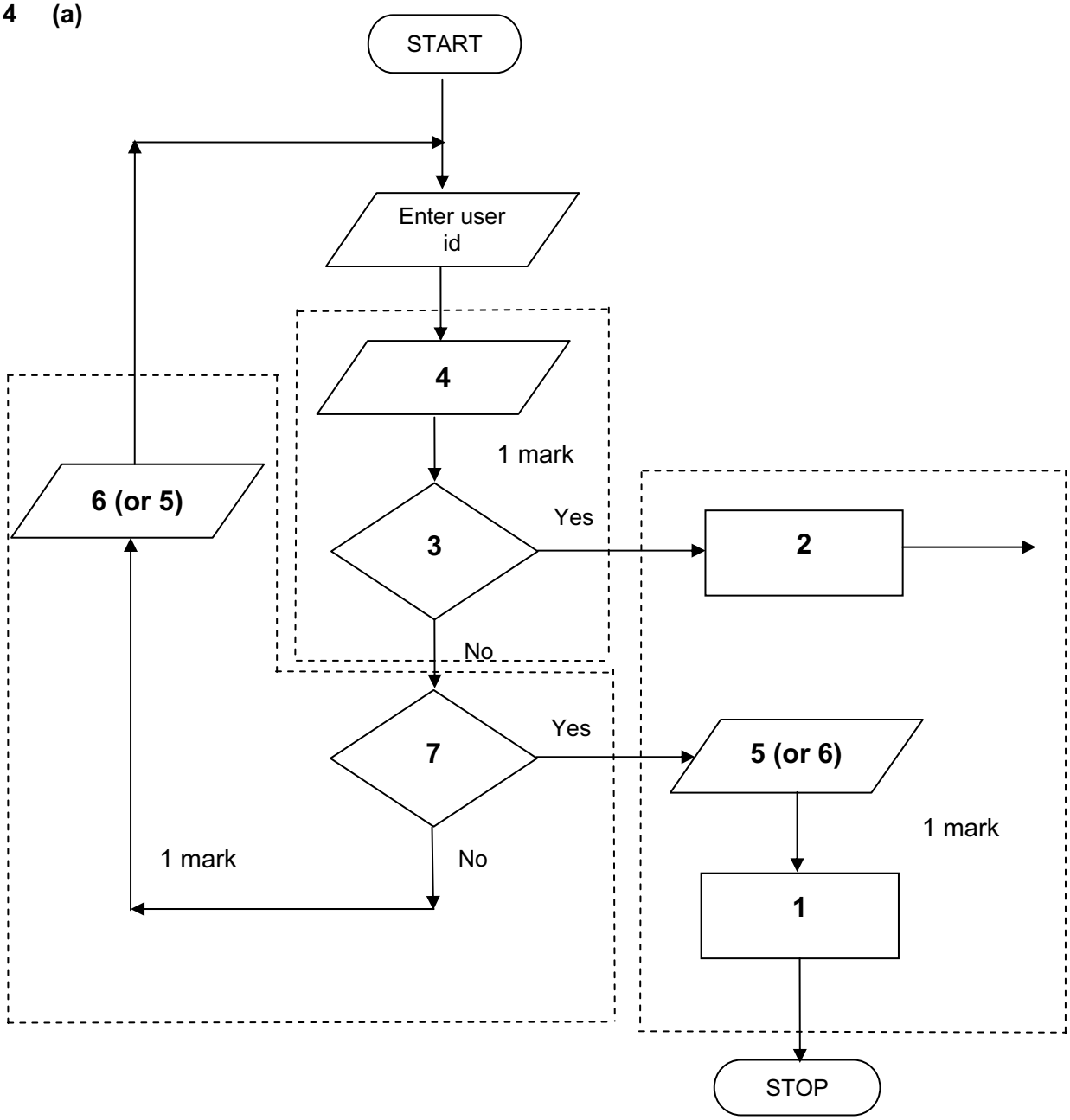
[1]

3 **(a)** STAR, BUS [2]

(b) Any **one** from:
- can use any station to access files, etc.
- can share files etc.
- can share resources (e.g. printer)
- allows easier communication between users [1]

(c) Any **one** from:
- more easily/more rapid transfer of viruses from computer to computer
- file (etc.) security is more difficult
- extra infrastructure costs e.g. cabling [1]

4 (a)



1 Access not allowed
2 Allow access
3 Do user id and password match
4 Enter password
5 Error message
6 Error message
7 Three attempts [3]

(b) verification [1]

5 **(a)** 2 marks (max) for RTTP points; 2 marks (max) for RTPC points

real time transactions	real time processing
– individual transaction processed as it occurs	– physical quantities continuously monitored – inputs compared with pre-set values
– files/fields/records updated immediately	– processed fast enough to affect input
	– uses sensors, ADC, DAC, etc.
– e.g. online booking of seats	– e.g. temperature control in air con [4]

(b) Any **two** points from:
- file management
- input/output control
- spooling
- memory management
- multiprogramming
- multitasking/JCL/batch processing
- handling interrupts
- error reporting/handling
- security (e.g. virus checking)
- user interface (e.g. WIMP)
- processor management
- loads/runs programs
- user accounts
- utilities [2]

6 **(a)** Any **one** from:
- reduced costs (no/less printing, no/less distribution of directories)
- faster/easier updating procedure
- raising profile of company [1]

(b) Any **two** from:
- faster/easier to find information
- more accurate/up-to-date
- more information/data available
- could easily extend to international directories [2]

(c) Any **one** from:
- more likely to get calls from call centres/sales companies
- unsolicited calls
- mis-use of details [1]

(d) Any **one** from:
- number changed and not registered
- errors in the information [1]

7 (a) (i) Any **one** from:

– interview customers
– hand out questionnaires to customers [1]

(ii) 1 mark for method and 1 mark for reason:

– DIRECT
– must have only one way of conveying/updating the information

– PILOT
– could adopt new system at one terminal only to trial new system

– PARALLEL
– Check new system is working correctly/back up in case of system failure [2]

(b) Any **one** from:
– current time
– terminal number/name
– date
– baggage reclaim/carousel number
– name of airline
– transfers/connections [1]

(c) Any **one** from:
– touch screens/touch pad/mouse/tracker ball [1]

(d) Any **two** from:
– fewer errors
– could be linked to website for live updates
– faster/more accurate updating of information
– no language problems for customers
– no need to wait in a queue at manned help desks [2]

8 (a) 1 mark for hardware and 1 mark for software:

<u>hardware</u>
– webcam
– microphone
– large TV/monitor/screen
– router/broadband modem
– communications cables
– speakers

<u>software</u>
– compression software/CODEC
– communications software [2]

(b) Any **two** from:
- language differences
- time differences
- controlling a 3-way conversation
- possible poor communications/loss of connection/slow connection
- delay in transmission [2]

(c) Any **two** from:
- less time lost in travelling
- can hold meetings with little notice
- safer (***must be qualified*** e.g. terrorism risk, less travelling, etc.)
- can involve more people company-wide [2]

9 **1 mark** for each error and **1 mark** for reason why it is an error

- line 1/negative=1 and/or line 2/positive=1

- negative and/or positive should be set to zero

- line 7/count=count+1
- don't need a count within a **for …. to next** loop
- replace loop with a **repeat...until** loop

- line 8/**print** negative, positive or line 9/**next** count
- outputs should come after the **next count** statement [6]

10 **(a)** 6 (fields) [1]

(b) 3002, 2002, 3003, 3004 [2]

(c) (Length (m) > 74) OR (Max Speed (kph) < 900)

← - (1 mark) - → ← - - - - - - (1 mark) - - - - - - →

OR

(Max Speed (kph) < 900) OR (Length (m) > 74)

← - - - - (1 mark) - - - - → ← - - - (1 mark) - - - → [2]

11 **(a)** Any **three** points from:
- (count) number of vehicles …
- … at various times of day/at different positions/in different directions
- put data into computer …
- … and try out different scenarios
- look at effect of accidents/break downs
- look at effect of heavy traffic
- determine optimum timings of lights
- effect of emergency vehicles/public transport [3]

(b) Any **two** from:

- less expensive (***must be qualified)***
- much safer prevents accidents/traffic problems through incorrect lighting times
- can try out many scenarios first (to give optimum settings)
- much faster than doing actual "experiments" on real lights [2]

(c) Any **two** from:

- sensors detect cars at each junction
- sends signals/data to computer
- computer software counts number of cars
- if analogue data, need an ADC
- compares sensor data with stored data/simulation results
- changes light timings/sequences as required
- (uses DAC) to send signals back to lights (control)
- continuously monitors [2]

12 (a) = SUM(B2:M2)/12 OR
= AVERAGE(B2:M2) OR
= (B2+C2+D2+E2+F2+G2+H2+I2+J2+K2+L2+M2)/12
[rounded] [1]

(b) = (L5 – L4) * L3 (must use cell references) [1]

(c) (i) graph "B" since rainfall usually measured as a height/bars
graph "B" since the information is clearer [1]

(ii)
- draw a line at value 8
- include a row with all values 8 and add this data [1]

(d) Any **two** from e.g.
- weather forecast for 7/14 days
- attractions/facilities in the area
- online booking e.g. hotels
- maps/how to get there
- buttons linking to other web pages/site
- videos/multimedia presentations
- search facility
- images of resort/virtual tours [2]

13 Any **four** from:
- collect information from expert(s)
- put information into the/create knowledge base
- develop YES/NO dialogue/user interface
- output screens designed
- fully tested with known expected outputs
- produce user manuals
- fully train users of the system
- reference to inference engine being created
- reference to rules base being created [4]

14 (a) **delete**

- customer leaves the bank/close account
- customer dies

amend

- change of address
- change of telephone number
- change account details
- change name after marriage
- transactions on account e.g. deposits, withdrawals

insert

- new customer joins bank/opens new account [3]

(b) (i) Any **one** from:
- saves memory/less space required on the file
- faster/easier to type in
- faster to search for information
- fewer errors [1]

(ii) 1 mark for name, 1 mark for reason and 1 mark for improvement

- AGE
- always changing
- need to keep updating each year
- date of birth [3]

15 EACH RESPONSE MUST BE DIFFERENT

(a) (i) Any **one** from:
- character/type check
- length check
- Boolean check
- presence check

(ii) Any **one** from:
- format check
- character/type check
- length check
- presence check

(iii) Any **one** from:
- range check
- character/type check
- presence check [3]

(b) Any **one** from:
- drop down lists showing M or F only, possible dates, etc.
- use of touch screens with only certain data options
- use of restricted lists
- radio buttons [1]

(c) (i) Any **one** from:
- lock computer
- log off the system
- if in an office, lock the door
- put into sleep/hibernate mode with password [1]

(ii) Any **one** from:
- to prevent RSI
- to prevent neck/back problems possible
- to prevent eye sight problems/headaches [1]

16 (a) Any **three** from:
- satellites transmit signals to computer/sat nav in car
- sat nav system in car receives these signals
- depends on **very** accurate time references/atomic clocks
- **each** satellite transmits data indicating location and time
- sat nav system car calculates position based on at least 3 satellites
- at least 24 satellites in operation world wide
- sat nav system combines satellite information with mapping info [3]

(b) Any **two** from:
- no need to read/own maps
- driver doesn't need to memorise route
- can give useful information such as location of garages/speed cameras/points of interest/traffic congestion
- allows driver to concentrate on driving (therefore safer)
- can find shortest/fastest route
- easier to re-route in case of road closures, etc.
- updateable [2]

(c) Any **one** from:
- stored maps out of date (instructions go to incorrect roads)
- inaccurate positioning
- loss of signal
- errors in original data/setting up
- sends vehicles down inappropriate routes
- over reliance by driver on the sat nav [1]

(d) Any **one** from:
- ships
- aeroplanes [1]

17 Marking Points

- initialisation of running totals (1 mark)
- correct loop control (1 mark)
- error trap for height input (1 mark)
- error trap for weight input (1 mark)
- sum total1 and average1 (i.e. height) calculation (1 mark)
- sum total2 and average2 (i.e. weight) calculation (1 mark)
- correct output (only if some processing attempted, must be outside loop) (1 mark)

[max: 5]

Sample pseudocode

```
total1 = 0: total2 = 0                                          (1 mark)

for x = 1 to 1000                                               (1 mark)

    input height, weight

        if height > 2 or height < 0 then print "error": input height    (1 mark)

        if weight > 130 or weight < 0 then print "error": input weight   (1 mark)

            else total1 = total1 + height: total2 = total2 + weight

next x

average1 = total1/1000                                          (1 mark)

average2 = total2/1000                                          (1 mark)

print average1, average2                                        (1 mark)   [5]
```