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)

START

Enter user id

4

1 mark

3 → Yes → 2

No

7 → Yes → 5 (or 6)

No

6 (or 5)

1 mark

1 mark

1

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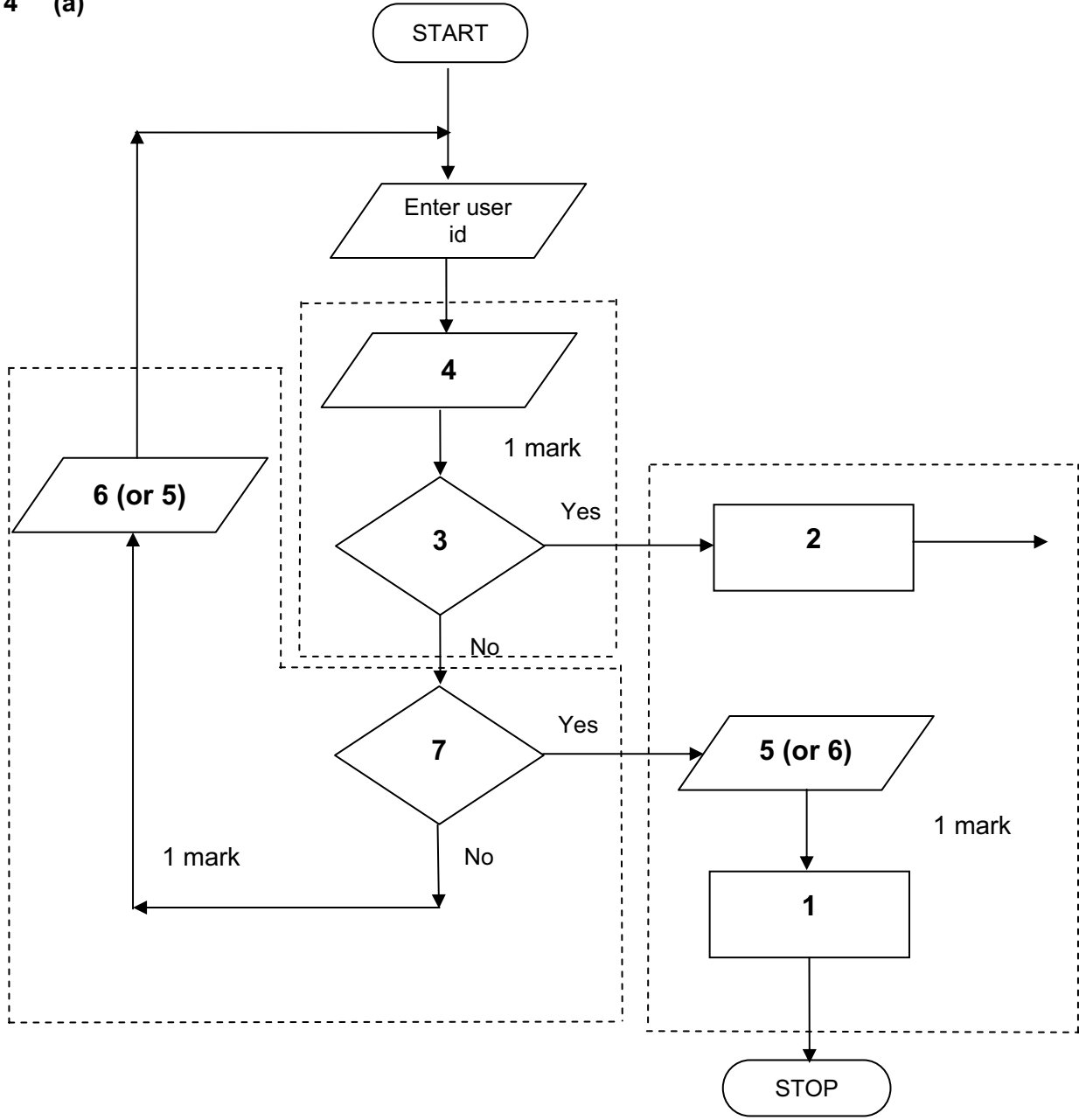
1   Access not allowed
2   Allow access
3   Do user id and password match
4   Enter password
5   Error message
6   Error message
7   Three attempts   [3]

(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. <u>online</u> booking of seats	– e.g. <u>temperature</u> 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:

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

software
– 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) <u>delete</u>

  – 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 <u>MUST</u> 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 <u>mode</u> 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 <u>Marking Points</u>

- 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]

<u>Sample pseudocode</u>

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]