UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

0420 COMPUTER STUDIES

0420/01 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 must be read in conjunction with the question papers and the report on the examination.

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1 Generally, one mark per valid point. Two examples can gain two marks.

(a) interrupt
signal sent from a device....
temporary ……
…. in (CPU normal) execution of instructions
to allow it to handle request from a device/peripheral/program
caused by external event
can be hardware or software generated
e.g. printer out of paper, <BREAK> key pressed, error in program [2]

(b) icon
picture/small symbol/graphic on the screen
used as a short cut to click on/launch an application
window *reduced in size* for later use (toolbar) [2]

(c) ROM
read only memory
can be read from/can't write to/can't change
non-volatile memory/keeps contents on switching off
used to store systems software
e.g. bios [2]

(d) buffer
temporary …..
… memory/storage (area)
to compensate for speed difference of device and CPU
used in transfer of data between computer and components
allows CPU to carry out other functions while printing (etc.)
e.g. printer buffer, keyboard buffer [2]

(e) validation
check on data input into the computer ….
… to find out if it is incomplete/unreasonable/sensible
check carried out by the computer
e.g. range check, length check, presence check, check digit [2]

2 Any **two** from:
nearer to English
portable
easier to modify/change/understand
easier to debug
no need to understand how the machine works
problem oriented [2]

3 **(a)** Any **two** problems and associated protections:

problem	**protection**
viruses	use anti-virus (software)
undesirable sites	put block on certain sites/keywords
over-use of computer	limit access to computer facilities
hacking	firewall, anti-hacking software, passwords
social networking	use of filters/supervision

[4]

(b) **(i)** any **one** from:

description of password use
(hierarchy of) user ids / log ins
use of dongle

(ii) any **one** from:

CD or DVD writer/drive
(flash) memory stick
external/portable hard disk drive

[2]

4 Any **two** ways (1st mark for method, 2nd mark for how it is used):

take photo/image with a (traditional) camera ….
….. scan in the photo/image

take photo/image with a digital camera ….
…. download/transfer photo/image to file

use an existing photo/image ….
…. scan/download in the photo/image

[4]

5 For **each** named method give 1 mark for advantage and 1 mark for disadvantage

DIRECT

adv
- immediate benefits/less time wasted
- lower costs (only one salaries bill)
- less likely to malfunction since fully tested

disadv
- disastrous if it breaks down

PARALLEL

adv
- if new system fails, have the old system to fall back on
- possible to gradually train the staff
- can compare both systems when running together

disadv
- more expensive system (duplication of effort)
- more time consuming (2 systems operating)

PILOT

adv
- if new system fails, have the old system to fall back on
- possible to gradually train the staff

disadv
- more expensive system (duplication of effort)
- more time consuming (2 systems operating)

PHASED

adv
- if system fails, only a small part of the business affected
- no need for 2 sets of wages/salaries
- can ensure stage adopted works before expanding

disadv
- very slow as each stage needs to be proved first [4]

6 **One mark for example and one mark for reason e.g.**

VoIP type of telephone/Internet telephone

- uses broadband therefore low cost system (or free if to another computer)

online banking (and other service) facilities

- fewer staff required, therefore savings passed on to customer

- saves money not travelling to the bank

online shopping/buying tickets/travel agents

- no need for staffing (etc.) therefore reduced costs to customers

emails

- save on postage costs (etc.)

teleworking

- saves money on transport (not having to got to the office) [4]

7 **(a)** Any **three** reasons from:

travel disruption due to terrorism/increased airport security
improved work – life balance for staff using video conferencing
large cost savings in travelling (e.g. some companies have reported savings of up to £30 million per year)
time savings because no travel required
broadband networks now replacing much slower dial up networks
no longer large time delays in transmission – so more realistic
increasing number of multi-national companies
urgent meetings can be held at short notice [3]

(b) Any **one** software item and any **two** hardware items from:

codec (engine that compresses video and audio signals)
communications software
synchronisation software

speakers
microphones
telecommunication network/broadband connections
webcams/video cameras/digital cameras (NOT just camera)
display screens [3]

(c) Any **two** from:

emails (+ attachments)
chat lines/instant messaging/online forums
VoIP telephones and video systems
social networking [2]

8 **(a)** Any **two** from:

count people at the check-outs
allows optimum number of check-outs to be open
run computer model with differing scenarios [2]

(b) **(i)** infra-red sensor [1]

(ii) any **two** from:

safety reasons (in case of fire, for example)
how many check-outs to open
check on how many customers use s/market at different times
feed information into simulation/model [2]

(c) **(i)** any **one** from:

touch screen/pad
trackerball [1]

(ii) any **one** from:

special offers/goods on sale
map of supermarket/where things are
prices of goods
services available (e.g. insurance) [1]

(iii) any **one** from:

quick to update
more information can be made available
could allow interaction with customers [1]

9 2
4
1 [3]

10 **(a)** Any **two** from:

can view at any time
can view as often as you like
can print out layouts of rooms
interactive system
no need to visit house / view more houses in less time [2]

(b) Any **two** from:

take photos with a digital camera
photos taken from a single point
camera rotated around the room
images are "stitched" together using software
movies re-sized and configured for Internet use [2]

(c) Any **two** from:

broadband Internet connections
large memories in modern computers
compression software
digital cameras
faster processors [2]

(d) Any **one** from:

hot spots/navigational tool – user clicks and walks through a door into another room
integration – integrates plans or maps [1]

(e) Any **one** from: e.g.

inside chemical plants
inside nuclear plants/reactors
hotels
games
training
interactive mapping
museums [1]

11 **(a)** (E4) (=) B4 * 3 + C4
(B4*3 + C4*1 + D4*0 also correct) [1]

(b) (H4) (=) F4 – G4 [1]

(c) Any **two** from:

validation checks - no negative numbers
- whole numbers only
- no letters/type check
- range check

check if sum of numbers in column G = sum of numbers in column F
check if the sum of the numbers in column H = 0 [2]

(d) E8, H8, E10, H10
← 1 mark → ← 1 mark →
<u>columns</u> E and H (1 mark only) [2]

12 **(a)** Any **one** from:

infra-red sensors (to detect movement)
ADC (in case sensors are analogue) [1]

(b) Any **one** from:

need analogue signal to operate camera motors to move lens/camera
computer output is digital [1]

(c) Any **one** from:

movement detected
computer compares new image with last image
images are stored and played back later [1]

(d) Any **two** from:

no film processing to be done/doesn't run out of film/cost of buying film
instantaneous checks
camera won't need manual emptying [2]

(e) **(i)** 400/0.4 = 1000 images
alternative answer 400/0.0004 = 1 000 000 images approx
(1 048 576 exactly) [1]

(ii) store images on another hard drive or on DVD/CDs
archive old images [1]

13 **(a)** 8 [1]

(b) 1112, 1115 [1]

(c) (**special edition** = "Y") OR (**number of tracks** > 10)

< — — —1 mark — — —> < — — — —1 mark — — — —>

(**number of tracks** > 10) OR (**special edition** = "Y")

< — — —1 mark — — —> < — — — —1 mark — — — —> [2]

(d) 1114, 1118, 1116, 1117, 1111, 1112, 1115, 1113 [1]

(e) **(i)** Any **one** from:

(auto capture) on the database itself
transaction file
spreadsheet [1]

(ii) link through the reference number/CD title/primary key [1]

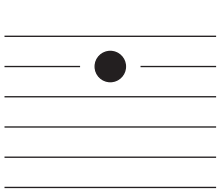
14 Any **four** points from:

get information from experts
input data into knowledge base
create rules base
create inference engine
create human-machine interface/question and answer sessions
firstly test system with "known" problems and solutions
create output system screen/format
create/design validation routines [4]

15 (a) TAB: 0 1 1 1 0 1

FRET: 0 1 0 0 1 0

(b) (i)



[1]

(ii) 19 [1]

(c) Any **two** from:

can store music directly onto digital, optical media/mp3 players
easy to modify music by simply changing binary values
easy to teach somebody how to play an instrument
easy to convert music for other instruments
allows auto play back through interfaces
uses less memory [2]

16 (a) Any **two** from:

eliminates ticket fraud
can't get lost (in the post)/sent to wrong address
easier to amend flight details (no tickets to re-print)
reduces booking expenses
faster processing
can check-in from anywhere (therefore saving queuing time at airport) [2]

(b) Any **two** from:

computer crashes (therefore "disappearing reservation" – in such cases, paper tickets are better)
e-tickets <u>not</u> "portable" between airlines whereas paper tickets are
human confidence – prefer to have "proof" of booking with paper ticket [2]

(c) Any **two** from e.g.

destination airport
starting airport
name(s) of passenger(s)
passport number/nationality
special requirements
number of passengers
dates/times of flights
cost of tickets
full flight itinerary
special offers
information about the airlines
information about flight facilities
sort on cheapest/fastest routes/flights
ability to check availability of flights/search for flights
terms and conditions [2]

17 (a) 100 (km/hr) [1]

(b) **Marking points**

Initialisation (slowest = 1000 or an equivalent high value)
Correct loops structure and control
Input (in correct place)
Calculation of final speed using given formula in part (a) inside the loop
Output the final speed for ALL cars inside the loop
Calculation highest speed input
Calculation slowest speed input
Calculate the average (two parts to this calculation)
Final outputs (correct place + some form of processing done) [6]

Sample program:

```
total = 0                                   } 
highest = 0                                 } 1 mark
slowest = 1000                              }
for n = 1 to 500                            } 1 mark
    input time                              } 1 mark
    finalspeed = 200/time                   } 1 mark
    print finalspeed                        } 1 mark
    total = total + finalspeed
    if finalspeed > highest                 }
        then highest = finalspeed           } 1 mark
    if finalspeed < slowest                 }
        then slowest = finalspeed           } 1 mark
next n
average = total/500                         } 1 mark
print average, highest, slowest             } 1 mark
```