UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 (a) byte

any **two** points from:
fixed number of bits/8 bits
represents a character
unit of memory/storage
e.g. 11010001 [2]

(b) CD-ROM

any **two** points from:
(secondary/portable) storage medium
can be read only (memory)
cannot change data

e.g. used to store programs/data/pictures/films, etc. [2]

(c) interrupt

any **two** points from:
a signal/request generated by a device/program
causes a break in execution of a program/stops the program
e.g. printer out of paper, pressing break key [2]

(d) buffer

any **two** points from:
temporary store/memory
allows speed of CPU/devices to be matched
to hold data being transferred between peripherals and CPU
e.g. pages stored waiting to be printed [2]

(e) virtual reality

any **two** points from:
3D world
computer simulation
needs special input devices to interact – (data) goggles/gloves
e.g. design of chemical plants [2]

2 Any **two** differences from:

high level	**low level**
portable	
problem-orientated	machine-orientated
close to English	can be difficult to read/understand
one-to-many relationship	one-to-one relationship
easier to debug/change/upgrade	needs assembler
needs compiler/interpreter	

[2]

3 **(a)** Any **three** points from:

knowledge base
rule base
inference engine
(suitable) input/output interface/shell [3]

(b) Any **one** example from, e.g.

mineral/oil prospecting
tax/financial calculations
chess
diagnostics
speech recognition [1]

4 **(a)** Any **one** advantage from, e.g.

can bank from home
(disabled) customers do not need to go to bank
no need to queue at bank
can make payments/check accounts from home
banking 24/7
can bank with any bank in the world
better interest rates available [1]

(b) Any **one** advantage from, e.g.

no need to have offices (in every town)
increased banking profits (less overheads)
larger customer base (worldwide)
fewer staff required [1]

(c) **(i)** Any **one** positive effect from, e.g.

less pollution
less traffic

(ii) Any **one** negative effect from, e.g.

less (social) interaction
job losses/closing down of branches
inner cities become “ghost towns”
increase in online fraud/hacking [2]

(d) Any two from:

fraud
viruses
bogus sites
loss of personal contact with the bank [2]

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

passwords/biometrics
user id/access rights
firewall
removable storage media
physical protection [1]

(ii) encryption [1]

(b) Any **three** from:

data must be kept up-to-date
data must be accurate
data must be obtained/used legally/lawfully
data must be adequate, relevant and not excessive
data must only be used for the stated purpose
data must not be kept longer than necessary
data must be kept secure
data must be transferred only to countries that offer adequate data protection
data holder must register with DPC
data subjects have the right to have incorrect data removed/changed
data subjects have a right to see a copy of their own data in an understandable form [3]

6 1 mark for each method + 1 mark for each description/reason

email work home	– use of attachments – use of home email address/account
save on floppy disk/CD-R, etc.	– would need same devices at home – portable therefore easy to take home
print out work	– have to type information in again – need to scan in print-outs
access work from internet	– need internet access at home – needs to access school website [4]

7 Any **three** reasons from:

easier/faster to update books (science is always changing)
fewer printing/distribution/production costs/no paper costs
easier/faster distribution
no need to find storage for the books
can have links to other sites
easier/faster to search for a topic (rather than search an index)
possible to include sound } multi-
possible to include animation (video) } media
possible to include interaction [3]

8 Any **three** tasks from:

file management
input/output control
spooling
memory management
multitasking/JCL/batch processing
multiprogramming
handles interrupts
error reporting/handling
security, e.g. virus checking
interfaces with user/WIMP environment
loads/runs programs
processor management
user accounts
utilities [3]

9 **(a)** Any **two** points from:

meeting between 2 or more participants at different sites
using computer network/WAN/internet
to transmit audio and video data
each participant has a video camera/webcam, microphone and loud speakers
images appear in real time on participants screen(s) [2]

(b) Any **three** points from:

no need for office space
saves on travelling time
saves on travelling costs/hotel costs/conference room costs
can have meetings at short notice
safer – no need to travel to venues
disabled staff can work from home/no need to travel to venue [3]

(c) Any **one** advantage from:

time differences do not cause problems
can send attachments
fewer language difficulties (auto translators)
emails can be read later [1]

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

scan in the documents
type in the documents (using a keyboard)
using voice recognition [2]

(b) (i) user documentation/guide [1]

(ii) Any two from, e.g.

how to load software
how to run software
how to log in and out
how to save files
screen layouts
sample runs
troubleshooting guide
hardware requirements
software requirements
print formats
how to print [2]

(c) (i) technical documentation/systems guide [1]

(ii) Any two from, e.g.
program listing
flowcharts, etc.
list of variables/data dictionary
file structures
purpose of the system/program
screen layouts
print formats
hardware requirements
software requirements
sample runs
(DO NOT allow the same marking point in parts **(b)** and **(c)**) [2]

(d) 1 mark for each method + 1 mark for each reason

parallel running	– allows back up in case of failure
direct changeover/big bang	– faster to implement/saves on wages
phased implementation	– can iron out problems before changing
pilot running	– system trialled by one section before total implementation

[4]

11 (a)

H	M
18	15
18	40

[1]

(b) Any **one** point from:

M would become 60 and should be 0 for correct time
H would become 18 and should be 19 for correct time [1]

(c) Would get a negative answer for H [1]

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

equipment id
date of purchase [1]

(b) Any **one** point from:

date equipment checked
time equipment checked
person who last checked the equipment
passed/failed
maintenance history [1]

(c) Any **two** advantages from:

automatic checking is now possible
can easily bring up history of device
not as easy to alter
results in improved safety
more accurate
no need to change the sticky label [2]

(d) Any **one** from, e.g.

stocktaking
supermarket tills
libraries [1]

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

"taught" by paint sprayer and robot remembers tasks
actions programmed in directly [1]

(b) Any **one** from:

use of sensors to detect car
presence of car fed back to robot's control system [1]

(c) 1 mark for fault condition + 1 mark for solution

out of paint – level sensor in paint reservoir
software fault – self diagnostics
hardware fault – self diagnostics
problem with external conditions – give warning and wait for human to correct and reset [2]

(d) Any **one** from, e.g.

space exploration
underwater exploration
work in dangerous chemical/nuclear plants
toys
manufacturing/assembling [1]

(e) Any **one** from:

cheaper – no wages
consistency
work 24/7 (do not need breaks, holidays)
can work in dangerous conditions [1]

14 (a) Any **one** in the range:

A2:B7 [1]

(b) SUM(B2:B7)

Or B2 + B3 + B4 + B5 + B6 + B7 [1]

(c) B2/2 [1]

(d) C4, D4, E4, C8, D8, E8, B8
–1 for each error or omission [2]

(e) B1:E1 B8:E8 [2]

15 (a) Any **two** advantages from:

easier to know when to re-order
automatic re-ordering
easier/faster to update
easier/faster to access information
more up to date stock levels
fewer mistakes
takes up less storage space [2]

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

double entry
visual check/comparison with original [1]

(ii) Any **two** checks from (accept examples):
(two **different** checks must be given but the same field can be given twice)

equipment	– character check, length check
code	– length check, character check, check digit
quantity	– range check, character check
need to re-order	– character check, length check, Boolean check
supplier name	– character check, length check
price	– format check, range check
stock value	– range check, character check [2]

16 (a) 40/10 = 4 [1]

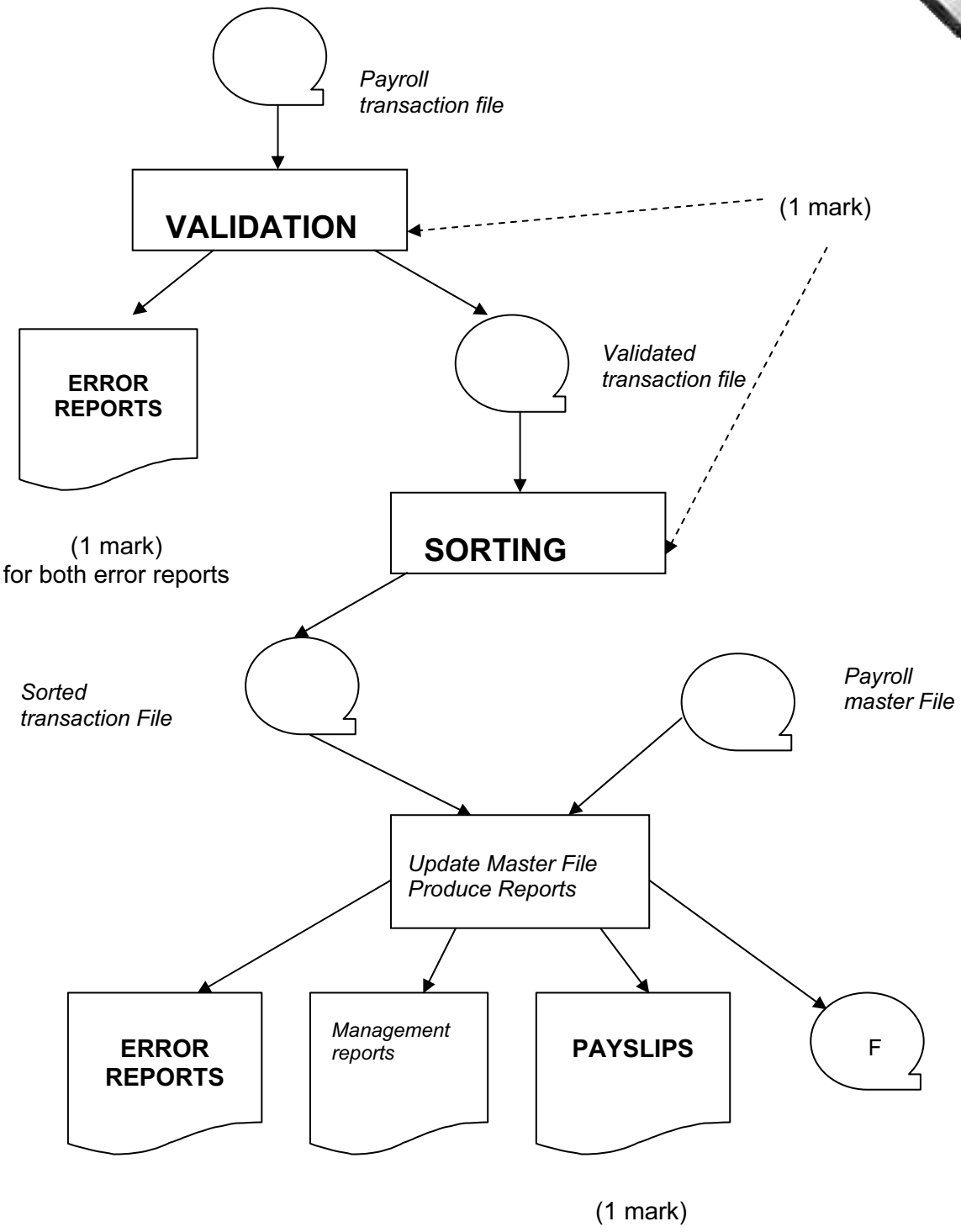
(b) general marking points

initialising **best** and **worst** to sensible values
correct loop for 1000 cars
correct use of calculation given in part **(a)**
output economy for each car inside loop
determining best economy
determining worst economy
calculating mean economy for all cars
input data **and** output all three results (only award mark if some form of processing done) [6]

sample program

```
total = 0, count = 0, best = 0, worst = 1000        1 mark
repeat                                              1 mark
    input litres, distance
    economy = distance/litres                       1 mark
    print economy                                   1 mark
    if economy > best then best = economy           1 mark
    if economy < worst then worst = economy         1 mark
    total = total + economy
    count = count + 1
until count = 1000
average = total/1000                                1 mark
print average, best, worst                          1 mark
```

17 (a), (b), (c)



[3]

(d) Any **one** point from:

no need for immediate/fast response
data collected about wages over a period of time not needing processing straight away [1]

(e) Any one example from, e.g.

stock control (NOT automatic)
billing systems
payroll [1]

18 (a) Any **two** points from:

graphics allows trends to be shown
figures/numbers are easier to read
figures/numbers show actual values
both methods are used for different purposes [2]

(b) compare new value with stored value [1]

(c) Any **two** advantages from:

do not need nurse/doctor to be there all the time
quicker to pick up problem with patient's condition
easier to obtain trends/analysis
more accurate/less likely to make mistakes [2]

(d) Any **one** point from:

no output influencing the input
no equipment controlled (e.g. valves)
pure monitoring – makes no changes to system being monitored [1]