

MARK SCHEME for the October/November 2007 question paper

<p>0420/01 0420 COMPUTER STUDIES Paper 1, maximum raw mark 100</p>

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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.

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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

portable
problem-orientated
close to English
one-to-many relationship
easier to debug/change/upgrade
needs compiler/interpreter

low level

machine-orientated
can be difficult to read/understand
one-to-one relationship
needs assembler

[2]

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- 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]

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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]

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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]

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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]

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11 (a) H M

18 15
18 40

(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]

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

“taught” by paint sprayer and robot remembers tasks
actions programmed in directly

(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]

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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]

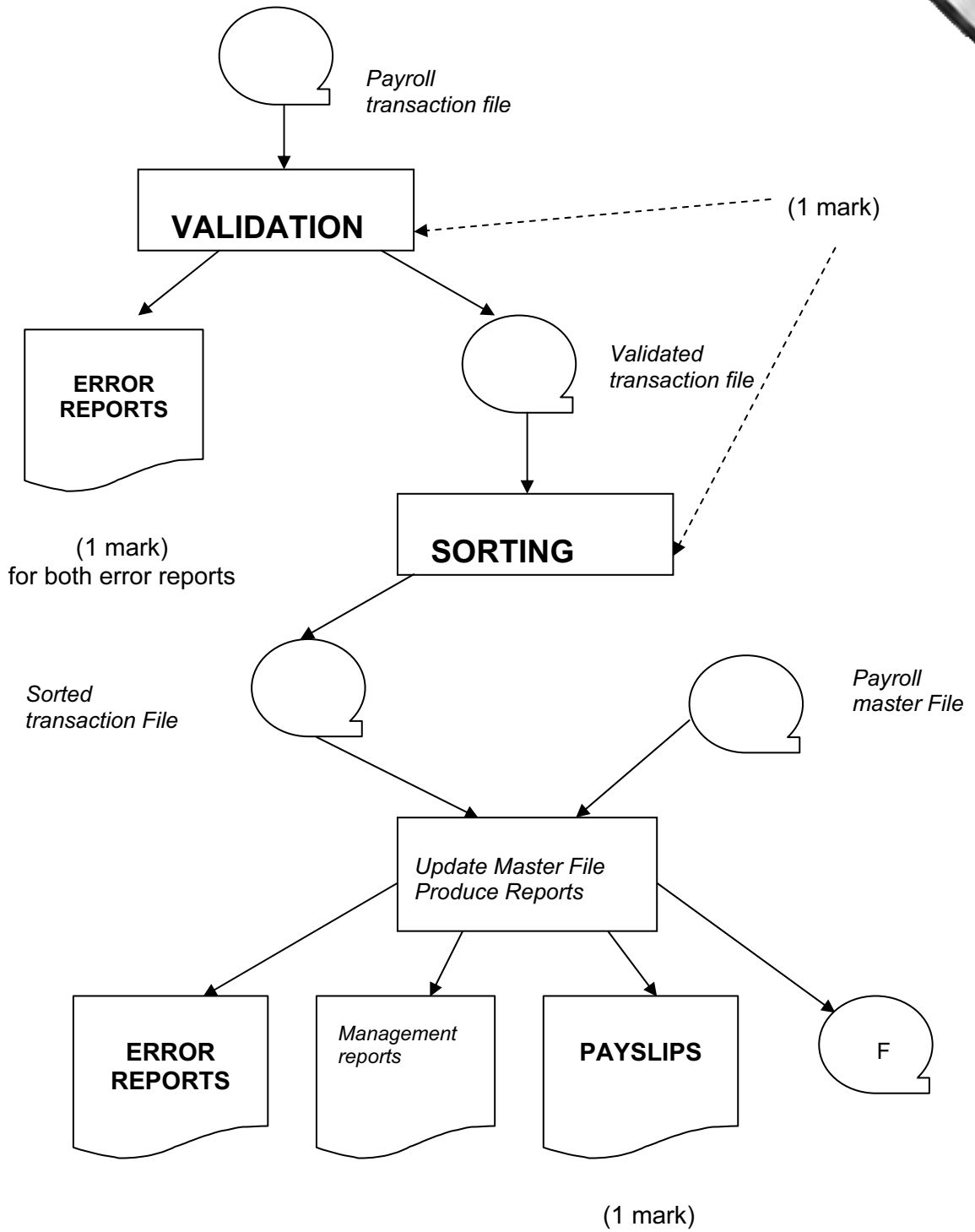
(b) **general marking points**

- 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]

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(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

(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]