

MARK SCHEME for the November 2005 question paper

0420 COMPUTER STUDIES

0420/01 Paper 1, maximum raw mark 100

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

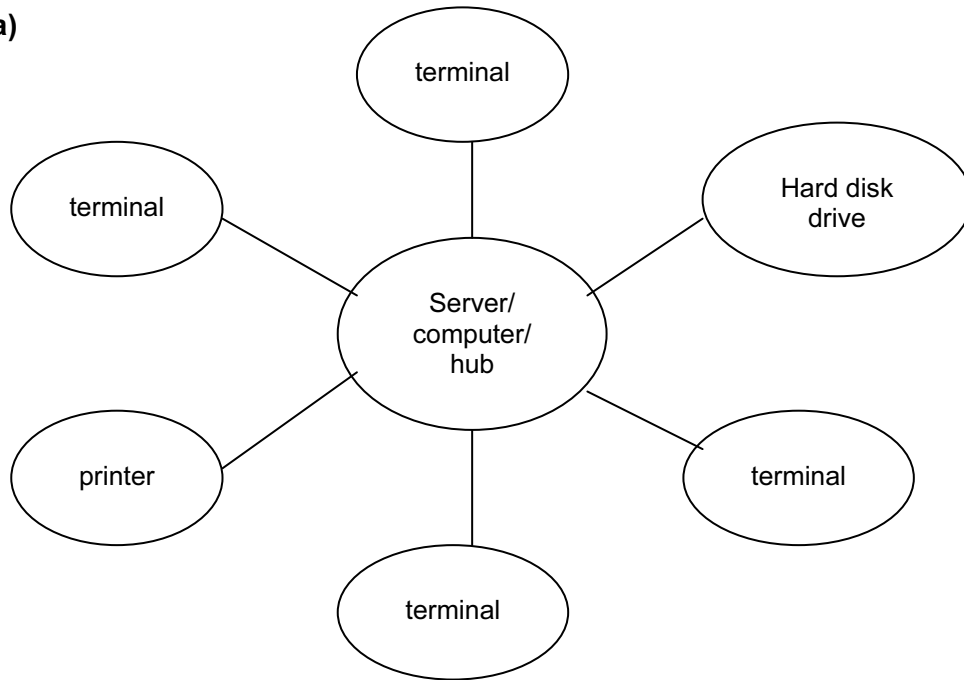
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- 1 (a) **Expert System**
Any **one** from
contains/programmed with the knowledge of human experts
knowledge base
inference engine
uses rules/rule base
man/machine interface
ability to “add to its knowledge”/learn from previous experience
examples: chess, medical diagnosis, mineral prospecting, car diagnostics,
tax calculations, etc. [2]
- (b) **Electronic scabbing**
Any **one** from
allows managers to switch ...
word processing/computer processing duties ...
from striking clerks in one country/location to non-striking clerks in another [2]
- (c) **Top down design**
Any **one** from
breaking larger tasks
into (successively) smaller tasks
step-wise refinement
examples allows use of modules, allows several programmers to work on task [2]
- (d) **Interrupt**
Any **one** from
a signal/message
generated by a device/operating system/hardware/software
which causes a break in the execution of a program/stops running of program
examples: overflow errors, disk full error, printer out of paper etc. [2]
- (e) **Buffer**
Any **one** from
temporary
store/memory
holds data being transferred between devices
often used to compensate for different speeds of devices
examples printer, disk, etc. [2]
- 2 Any **three** from:
less expensive option (reference to costs needs to be justified)
fully tested/more reliable/less errors
links with existing software
immediately available/quicker needs justification
expertise/programmers not available ready trained workforce [3]

3 (a)



1 mark for printer
 1 mark for terminals/workstation/computer/workbase
 1 mark for showing correct connections
 1 mark for hard disk drive
 1 mark for server/computer/hub
 (max of 3 mks)
 (simple unlabelled diagram can only gain a max of 1 mark)

[3]

(b) Any **one** from:
 gateway/router/proxy server/modem

[1]

4 (a) 1 mark for each cause and 1 mark for correct prevention

<u>Causes</u>	<u>Prevention</u>
Loss of software/files	Ensure files are protected (e.g. locked, hidden, etc.)
Hardware failure	Use parallel systems
Hacking into system	Use of passwords/firewall
(Sending) viruses	Anti-virus software/not opening suspicious emails
Loss of power	UPS/generator
Spam	Use of a filter

[4]

(b) Any **two** from
 Use file generations/grandfather-father-son method
 Re-load software/files
 Re-enter lost data
 (Use) back-up files to transfer data
 New/alternative hardware

[2]

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- 5 (a) Any **two** points from
 processing takes place in one go/all at once/at a convenient time
 when data has been collected
 no human interaction required
 reference to JCL
[2]
- (b) Any **one** point from
 (real time transaction system is an) on-line system ...
 in which transactions are processed as they occur
 always up to date
[1]
- (c) (i) Any **one** from
 payroll
 updating stock levels at end of the day
 printing out invoices
 printing out orders
[1]
- (ii) Any **one** from
 getting prices
automatic stock levels
 on line shopping
 credit card transactions
 calculating the bill
[1]
- 6 (a) Any **two** from
 can print confirmation/boarding pass
 can see seating plans
 easier to locate special offers
 encryption of data/https
 telephone can be engaged/waiting in queuing system
[2]
- (b) direct/random access
 Any **one** from
 need to update files immediately
 requirement for fast access
[2]

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(c) (i) Any **one** from
character/type check
length check
range check
allow sensible examples

(ii) Any **one** from
format check
length check
range check
cross field check i.e. cannot be after date of return flight

(iii) Any **one** from
length check
check digit
character/type check

(**three different** validation checks are needed for all three marks) [3]

7 (a) Finance/Management [1]

(b) (NOTE: Accept FS AUSTRIA one box to the left)

K	S	C	H	R	O	D	E	R					F	S	A	U	S	T	R	I	A					0	8
---	---	---	---	---	---	---	---	---	--	--	--	--	---	---	---	---	---	---	---	---	---	--	--	--	--	---	---

<----- 1 mark -----><-----1 mark -----><1 mk>

[3]

(c) Any **two** advantages from
shorter, therefore less memory/storage used
shorter, therefore less typing required/faster input
less chance of errors being made
easier/faster to carry out searches/process data
easier/faster to do validation checks

[2]

(d) (i) Any **one** from
changes every year
files would need to be updated every year

[1]

(ii) date/year employee joined the company [1]

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- 8 (a)** Any **three** from
allows 3D imaging
can carry out calculations e.g. costing, volume, area, stress
test the design
graphics features (arcs, in-fill, zoom, scale, etc.)
access to previous designs/library of parts
easy to modify drawings to suit customer requirements
drawings are more accurate

(reference to CAM = 0)

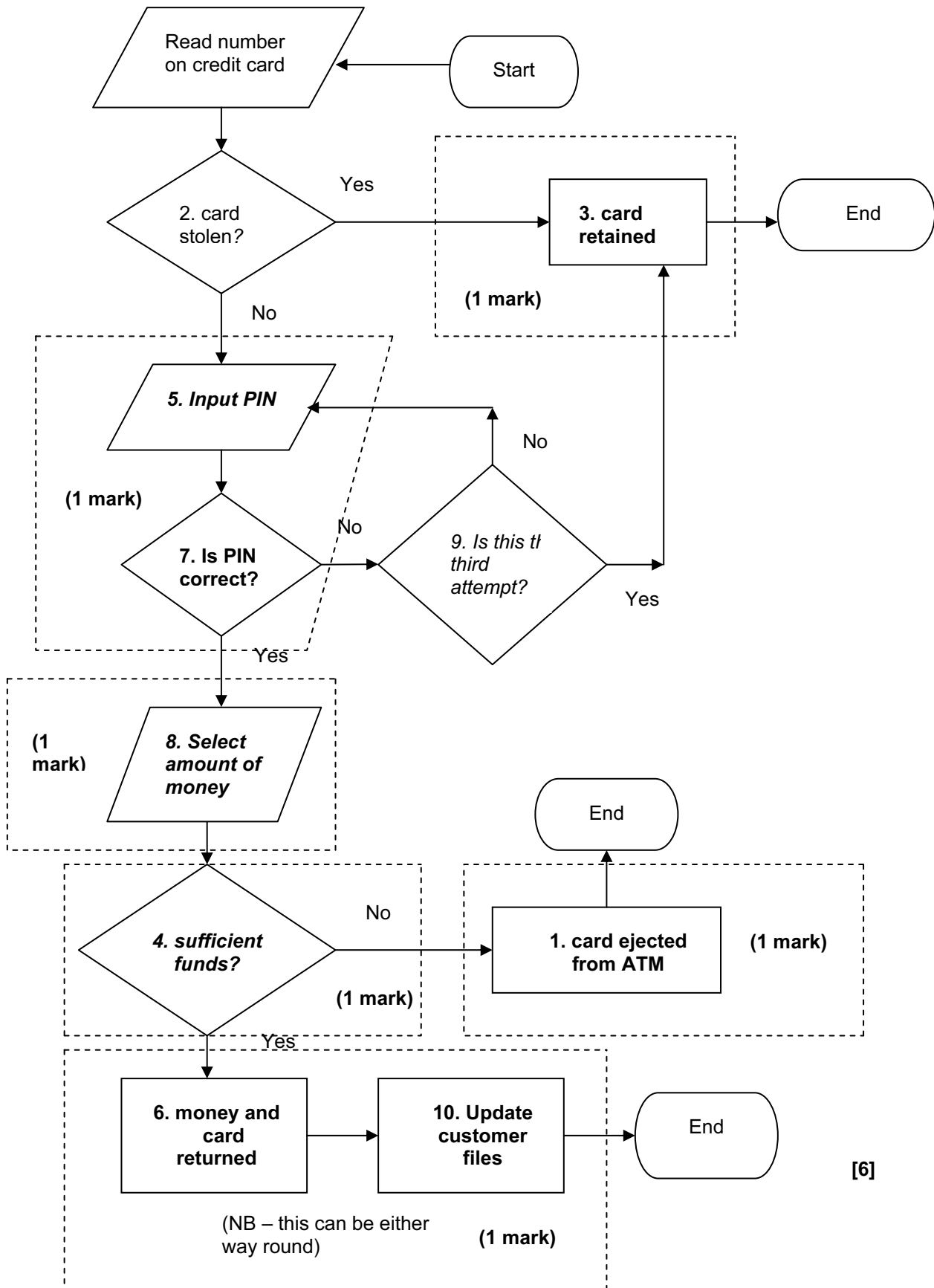
[3]

- (b) (i)** high resolution monitor/projector

(ii) (graph) plotter/inject printer plus specification

[2]

9



[6]

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10 (a) Any **one** from

Digital displays:

actual numbers

LED/LCD sections lighting up

[1]

Any **one** from

Analogue displays:

dial read out

continuous variation/wave representation (e.g. sound, temperature)

[1]

(b) Any **one** from

faster response

more robust (no mechanical bits to go wrong)

no user interpretation required/easier to read

[1]

(c) Any **one** from

more natural/humans used to the format

readings are steadier/less fluctuation

easier to repair if fault develops (no electronics)

more accurate

[1]

(d) (i) Any **one** named device from

e.g. television/radio/video/washing machine/camera/toaster

(ii) Any **one** description which must match up with choice in part (i)

e.g. stores channels/controls recording timings/controls chosen wash cycle/controls shutter speed/controls timing

[2]

11 1 mark per input device + 1 mark for correct reason

input device

reason

- tracker ball

- to control on-screen pointer

- if limited mobility in hands

- voice input/microphone }

- to control data input to the computer

speech recognition }

- if user unable to use the keyboard

- touch screen

- using a head wand/fingers

- to select options from a screen menu

- foot activated input devices

- when operator has no arm movement

- used instead of mouse or keyboard

- braille keyboard

- raised dots on keyboards to id keys

- to help blind people input data

1 mark per output device + 1 mark for correct reason

output device

reason

- audio output/speaker

- to help blind/partially sighted people

- who cannot see output on a screen/so

they can hear the output

- braille printer

- to help blind/partially sighted people

- to read output from the computer

[4]

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- 12 (a)** Any **two** analysis tasks from
 understanding the current system/modelling the current system/Data Flow Diagram
 identification of the user's requirements
 interpreting user requirements
 defining user requirements for the new system
 research using interviews, observation, questionnaires, looking at existing documentation
 agreed objectives
 collecting data from existing system

(cost benefits = 0)

[2]

- (b)** Any **two** design tasks from
 select/specify hardware
 select/specify software
 design input specification/screens
 design output specification/screens
 file design
 break down of the task/top down design/modularisation
 estimate the resources required
 systems/process flowcharts/block/structure diagrams
 process algorithms
 design data capture forms
 design reports
 design forms
 design test plan
 produce implementation plan
 validation techniques

[2]

- (c)** Any **two** implementation tasks from
 produce documentation
 install hardware and software
 testing of the software/system
 training of staff to use system
 transferring of files to new system
 system changeover (i.e. direct, parallel, pilot or phased)
 maintenance/fix any unexpected problems
 creation of files

(test strategy = 0)

[2]

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13 (a) either

B2/2 or B2*0.5 and C2/2 or C2*0.5

or

B2/2 or B2*0.5 and B2/4 or B2*0.25

[2]

- (b)** Any **two** from
draw graph ...
read off values for years 2008 and 2010
add two extra columns in the spreadsheet ...
estimate values using new formulae

[2]

(c) either

SUM(B2:B6) B8=SUM(B2:B6)
(NOT SUM(B2:B6)=B8)

or

(B2+B3+B4+B5+B6) B8=(B2+B3+B4+B5+B6)
(NOT (B2+B3+B4+B5+B6)=B8)

[1]

14 (a) Any three from

- increases productivity
- saves on office space
- increases staff motivation
- makes trading hours more flexible
- allows employment of staff irrespective of location
- lowers absenteeism
- increased staff retention
- reduction in office requirements e.g. heating, lighting, ancillary staff, etc.
- easier to employ disabled workers quota

[3]

- (b)** Any **two** from
reduces travelling costs
reduces travelling time/less commuting time
reduces stress levels
allows greater flexibility/social life/family life
greater job satisfaction
disabled employees are not disadvantaged

[2]

- (c)** Any **two** from
use of video conferencing/teleconferencing facilities
Internet access
electronic mail – can send attachments (e.g. video)
broadband – fast transmission of data allows real time interaction

[2]

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- 15 (a) 1 temperature sensor } 1 mark
 2 ADC } 1 mark
 3 computer } 1 mark
 4 DAC } 1 mark

(maximum of 3 marks)

[3]

(b) Any **two** from

- control system where the output can affect the input to the system
- stored value compared with input
- current temperature is feedback value
- output from system changes (e.g. switch on chemicals pump) to try and equalise the two values
- process is repeating loop

[2]

(c) Any **two** from

- safer system (no need for manual intervention/automatic control)
- better/more accurate temperature control
- easier to modify process when under computer control
- possible to interrogate system (e.g. produce temperature graphs)
- more efficient (less energy wastage) due to more accurate control
- continuous(24/7) process
- quality of product is more consistent

(more accurate = 0)

[2]

16 (a) Any **three** from

- use of photographs/pictures/graphics
- use of sound/audio/music
- use of different fonts/text
- reveal techniques
- call up software/files.....allow examples
- use of hyperlinks
- connect to a web page
- use of animation effects
- embedded videos
- timed transition between pages
- presentation themes

[3]

(b) Any **two** from

- emails
- file attachments can be sent
- compressed file/zip
- reference to use of web site
- (reference to send by post = 0)

[2]

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17 Sample program

```

m1 = 100
m2 = 0
sum = 0
n = 1
while n < 151 do
  repeat
    read mark
  until (mark >= 0 and) mark <101
  if mark < m1 then m1 = mark
  if mark > m2 then m2 = mark
  sum = sum + mark
  n = n + 1
endwhile
average = sum/150
output average, m1, m2

```

[6]

General mark points

initialisation (must correctly set smallest (m1) and largest (m2) boundaries)
 method for looping round for 150 students
 reading in marks for all students
 checking if mark inside 0 to 100 boundary and action taken
 setting value of smallest (m1) after checking against input mark
 setting value of largest (m2) after checking against input mark
 totalling all marks together
 calculating the average mark
 output of average, smallest mark (m1), largest mark (m2)