

MARK SCHEME for the May/June 2007 question paper

0420 COMPUTER STUDIES

0420/01

Paper 1, maximum raw mark 100

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1 (a) **virus** any **two** points from:

program/software
which replicates/copies itself
alters/damages files/alters files or data
e.g. examples of the effect of a virus

worm = 0
trojan horse = 0
name of virus = 0
bomb = 0

[2]

(b) **verification**

any **two** points from:

check on input for errors/checking before & after transfer
by double entry
on screen checking
comparing input/use of second operator
e.g. password typed in twice

proof reading = 0

[2]

(c) **interrupt**

any **two** points from:

a signal/request generated by a device/program
causes a break in execution of a program/stops program
e.g. printer out of paper

power cut = 0

[2]

(d) **simulation**

any **two** points from:

studying behaviour of a system
by using a model/represents real life/mathematical representation
results can be predicted
e.g. flight/other simulator, modelling hazardous chemical reaction

games = 0

[2]

(e) **electronic scabbing**

any **two** points from:

allows managers to switch ...
word processing/computer processing duties ...
from striking clerks in one country to non-striking clerks in another

[2]

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2 Any **two** types from:
(1 mark for naming type of test data. 1 mark for description or suitable example)

Normal - acceptable/valid data
- data has expected outcomes
- example (e.g. day of month 1 to 31) needs context, range OK

Abnormal - data outside limits of acceptability/validity
Erroneous - example (e.g. day of month -1, 50, etc.)

Extreme - data at limits of acceptability/validity
Boundary - example (e.g. day of month 1, 31, etc.)

[4]

3 **Two** points **one** from each group:

speech recognition is a form of input;
speech recognition requires a microphone;
speech recognition is an example of an expert system

speech synthesis is a form of output
speech synthesis requires speakers
in speech synthesis words are chosen from a database

[2]

4 Any **three** points from:

- file management
- input/output control/peripheral management
- spooling
- memory management
- multitasking/JCL/batch processing
- multiprogramming
- handling interrupts
- error reporting/handling
- security
- interfaces with users/WIMP type interfaces
- loads/runs programs
- processor management
- manages user accounts
- copy/save/format/DOS utilities

resource management = 0

[3]

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5 (i) Any **one** advantage and any **one** disadvantage from:

advantages

- no travel (∴ saves money)
- no time wasted in travelling
- more time for family life
- more flexible working hours
- equal opportunities for all
- more motivated (**)

disadvantages

- too many distractions
- less social interaction with others
- less visible status for senior employees

(ii) Any **one** advantage and any **one** disadvantage from:

advantages

- lower overheads (no offices)
- more flexible/contented (**)
work force
- easier to employ disabled people
- workers can be anywhere in
the world
- can tap into world wide expertise
- (** - only allow in (i) OR (ii) not both)

disadvantages

- less control over work force
- could be doing work for more than one company
- difficult to get company loyalty
- more difficult to react quickly to changing situations

[4]

6 One mark for name and one mark for description

Data flow diagrams - describes data input/output into the system
- shows what happens to data within the system
(during processing and storage)

Modules/Structure
Diagrams/ - shows logic behind program structure
- allows task to be split into individual parts
- shows links in modules

(Systems) flowcharts/
diagrams - shows hardware
- shows how hardware links
- shows how processes are carried out

Gantt/Pert charts
(critical path analysis) - shows each stage with deadlines/milestones

[2]

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

- deskillling
 - retraining needed
 - loss of jobs
 - frees staff from admin jobs
 - less time wasted looking for lost paperwork
- [3]

(b) Any **two** from:

- passwords (changed regularly)
 - use of ids/log on ids/user names
 - firewalls
 - physical measures (e.g. locked rooms)
 - logging off after use
- encryption = 0
removal of external memory = 0
- [2]

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

- use of back up files
 - generations of files (GFS)
- [1]

(d) amend

- change name/address/doctor etc.
 - new illness
 - re-admission
- change of age = 0

delete

- patient leaves area/country
 - patient dies
- leaves hospital = 0

insert

- new patient arrives
 - new baby born
- [3]

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

- transfer images directly to computer (no need to scan in)
 - can easily wipe photos from memory
 - view pictures immediately
 - adjust pictures immediately
 - store more pictures in less space
- video possible = 0
- [2]

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

- number of pixels/memory size
 - the sensor (determines number of pixels)
- [1]

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- 9 (a) 7
5
- (b) 10110110 [1]
- (c) Any **three** points from:
Notes lift is going down
Notes required floor is less than present floor
Sorts remaining numbers into descending order of floors [3]
- 10 (a) (i) Any cell in the range A2:D6
(ii) Any cell in the range A1:F1, C7, D7 [2]
- (b) $(B2*5) + (C2*10) + (D2*20)$
(-1 for each error) NB Brackets not needed [2]
- (c) Any **two** points from:
Highlight/select E2/copy E2
paste into cells E3 to E6
(or equivalent (select + sign) using drag and drop, for example) [2]
- (d) $SUM(E2:E6)$
 $E2 + E3 + E4 + E5 + E6$ [1]
- (e) N [1]

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11 (a) 2
4
1

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

computer check on input data
detects any data which is incomplete or not reasonable

check data is wrong/correct = 0

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

length check – e.g. only 30 characters in name field
character check – e.g. name doesn't contain numeric chars
range check – e.g. day of month in date is between 1 and 31
format check – e.g. date in the form xx/yy/zz
check digit – e.g. end digit on bar code to check if it is valid
type check – e.g. integer, real
(presence check = 0)

[2]

12 Any **three** points from: (NB if disability mentioned, shouldn't conflict with method/device)

large/concept keyboards/switches
braille keyboards (for partially sighted/blind)
tracker ball to move pointer if keyboard/mouse can't be used
touch screens (using head wands)
software to predict words (e.g. for dyslexic people)
speech recognition
foot activated control (if no arm movement)
large icons/fonts on screens (– if partially sighted)
braille printers
speech synthesis
large screen
choice of colours

speakers = 0

[3]

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

- know prices of each item/check errors
- proof of purchase
- can check totals themselves
- can check items

[2]

(b) Any **two** ways from:

- using bar code reader/scanner/wand/gun to read bar code
- key in/type in/enter manually the number under the bar code

laser = 0

light pen = 0

[2]

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

- bar code read
- item identified on the file
- number of items reduced by 1 each time item is sold
- when new item come in/returned stock level increased by 1
- minimum stock level stored on file
- if stock level less than minimum/reorder level ...
- ... automatic re-ordering done

alert that stock low = 0

[3]

14 (a) 9

[1]

(b) 1023, 1911, 3456, 2516

(-1 for each ref number missing or for each incorrect ref number)

[2]

(c) Ignore case, comma 7
(Price(\$)) > 60000) AND (0-100 kph time (sec) < 7.0)

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

(0-100 kph time (sec) < 7.0) AND (Price(\$)) > 60000)

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

[2]

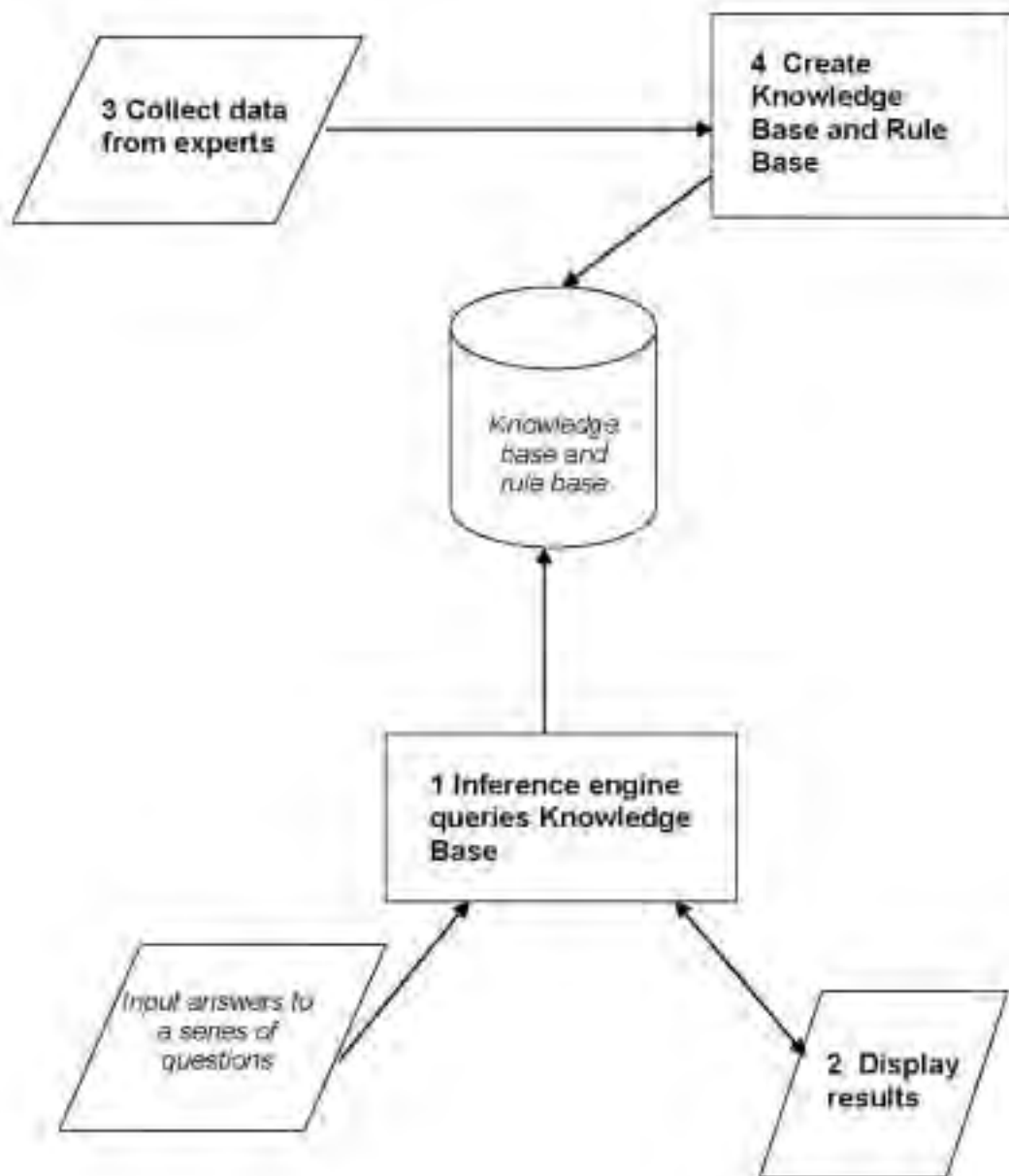
(d) Any **two** points from:

- bigger audience/world wide audience
- no need to advertise in the press (∴ cheaper)
- can have automatic replies to customers
- open 24/7

no showroom = 0

[2]

15 (a) 1 for each correct box max 3



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

- multiple choice questions
- yes/no answers
- takes user through the possible options
- touch screen with options

[1]

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

- possible faults
- % probability of the fault

[1]

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(d) Any **one** from:

- e.g.
- chess
- oil/mineral prospecting
- tax/financial calculations
- medical diagnostics
- speech recognition
- rock identification

[1]

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

- airflow (mass of air)
- oxygen/gas sensor
- throttle/accelerator position/potentiometer
- temperature
- voltage
- (manifold) pressure
- (engine) speed
- fuel level = 0
- heat sensor = 0
- thermometer = 0

[2]

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

- data from sensors fed to ADC
- data is fed continuously (loop)
- ADC converts data to digital form and sends information to ECU
- ECU has been programmed/stored with key values/data
- information from sensors compared with stored data
- signals sent to injectors to alter their operation as required
- reference to need for DAC
- reference to need for actuators

[3]

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

- environment (exhaust gases controlled)
- (better) fuel economy/more efficient
- fewer moving parts
- doesn't go "out of tune"
- fuel injection more accurate
- improved engine life = 0

[1]

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

- requires an immediate response
- needs to be on-line

[1]

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19 General marking points:

- loop – 1 mark
- input in correct place – 1 mark
- checks on code – 1 mark
- correct use of **if/then/else** or **case** statements – 1 mark
- increment all totals – 1 mark
- error recognition/validation – 1 mark
- correct output in correct place – 1 mark

[5]

Sample program 1:

```
set c, d, v, b = 0: set count = 0
repeat                                     1 mark
  input code                               1 mark
  x = code/10000                           }
  y = INT(x)                                } 1 mark
  if y = 1 then c = c + 1                   }
  else if y = 2 then d = d + 1              }
  else if y = 3 then v = v + 1              } 2 marks
  else if y = 4 then b = b + 1              }
  else print "error"                       } 1 mark
  count = count + 1
until count = 5000
print c, d, v, b                           1 mark
```

Sample program 2:

```
set c, d, v, b = 0: set count = 0
repeat                                     1 mark
  input code                               1 mark
  if code >= 1000 and code < 2000 then c = c + 1 }
  else if code >= 2000 and code < 3000 then d = d + 1 }
  else if code >= 3000 and code < 4000 then y = y + 1 } 3 marks
  else if code >= 4000 and code < 5000 then b = b + 1 }
  else print "error"                       } 1 mark
  count = count + 1
until count = 5000
print c, d, v, b                           1 mark
```

(NOTE – OK to use statements such as *if code begins with a 1* as code checks)