

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

[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) encryption = 0
use of ids/log on ids/user names removal of external memory = 0
firewalls
physical measures (e.g. locked rooms)
logging off after use [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 video possible = 0
view pictures immediately
adjust pictures immediately
store more pictures in less space [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 [2]
- (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 [3]

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

computer check on input data check data is wrong/correct = 0
detects any data which is incomplete or not reasonable

(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 speakers = 0
large screen
choice of colours

[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:

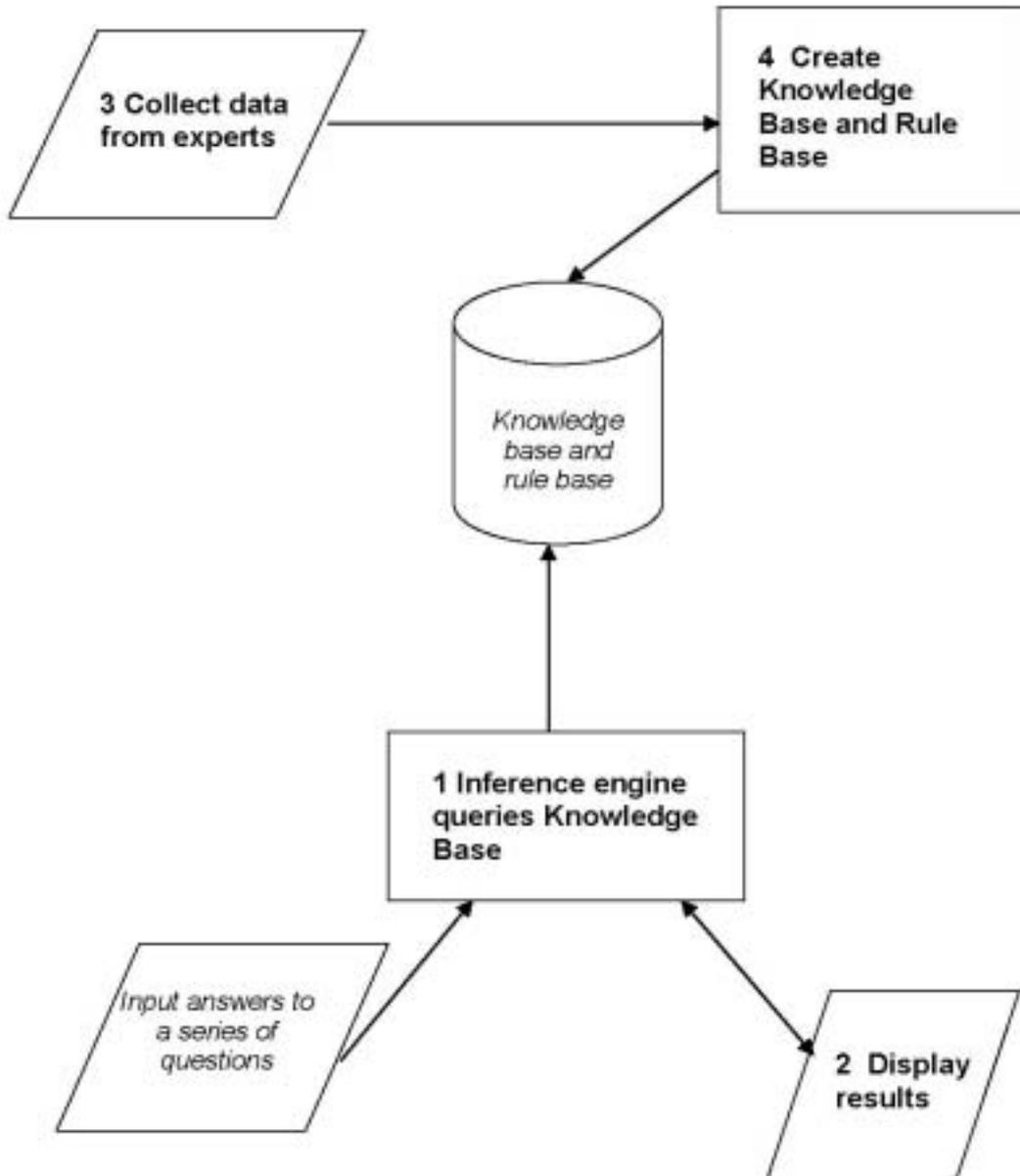
bigger audience/world wide audience
no need to advertise in the press (∴ cheaper)
can have automatic replies to customers
open 24/7

no showroom = 0

[2]

15 (a) 1 for each correct box **max 3**

[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)	fuel level = 0
oxygen/gas sensor	heat sensor = 0
throttle/accelerator position/potentiometer	thermometer = 0
temperature	
voltage	
(manifold) pressure	
(engine) speed	

[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"	improved engine life = 0
fuel injection more accurate	

[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)