CAMBRIDGE
INTERNATIONAL EXAMINATIONS

November 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 100

SYLLABUS/COMPONENT: 0420/01, 0421/01

COMPUTER STUDIES
Paper 1

1 (a) buffer

any **two** from:
temporary
store/memory
compensates for speed of CPU/devices to be matched
holds data being transferred between peripheral devices and CPU
example:
printer buffer to store data to be printed [2]

(b) verification

any **two** from:
checking of data/correctness — proofreading = 0
by re-keying — check transmission = 0
comparing/use of second operator
double checking
example:
checking correctness of passwords [2]

(c) gigabyte

any **two** from:
one thousand million/billion bytes
one thousand megabytes/8 billion bits — (8,589,934,592 bits)
one million kilobytes
a unit of storage
2^{30} bytes
example:
reference to hard disk storage, etc. [2]

(d) batch processing

any **two** from:
process does not start until
all data collected together
uses JCL
no user interaction
example:
payroll system
electricity/water/gas (etc.) billing
cheque processing [2]

(e) file generations

any **two** from:
successive versions of a master file/GFS
(periodically) updated
used in cases of systems failure — to do back ups = 0
transaction file used to update master file
example:
supermarket stock control/updating stock [2]

2 **(a)** **RAM** (max: 1 mark)
any **one** from:
storage of (user's) data/holds program
memory that can be used to read from/write to/change
directly addressable
temporary store
volatile memory
reference to dynamic/static RAM
reference to operating system

(NOT direct access)

modem (max: 1 mark)
any **one** from:
modulator-demodulator
device which interconverts digital bits and analogue signals
to allow computer signals to be sent over phone lines
to connect to the Internet

scanner (max: 1 mark)
any **one** from:
device for transferring or copying printed documents/graphics
converting to pixels/storing a computer file/digitise to scan = 0 [3]

(b) **electronic conferencing**
any **two** devices from:

microphone	telephone = 0
speakers	cabling = 0
web camera/video camera	network card = 0
sound card	keyboard = 0
video card	printer = 0
monitor/screen	
satellite dish	tv = 0

(NOT modem, memory – already in question) [2]

3 **(a)** any **two** from:
viruses can be introduced into the system
possibility of bribery/extortion/blackmail
fraudulent use of account money stolen from accounts = 0
industrial/commercial sabotage fraud = 0
computer system shuts down
locking user out by changing passwords [2]

(b) any **two** from:
passwords for users/files
PINs/passwords changed frequently
disconnection after 3 failed attempts at password
use of firewalls
use of encryption
dial back modems
(NOT physical devices such as locking door, computer) [2]

4 **(a)** any **two** from:
users can access same files fast = 0
avoids duplication
network s/ware cheaper than buying individual s/ware for each machine
sharing of expensive s/ware
easier to control access to the internet
messages can be sent between terminals/chatting
can monitor usage
shared printers/hardware
work can be accessed from any terminal [2]

(b) any **two** from:
when file server down, all terminals down
viruses can spread to all terminals
wiring (e.g. fibre optics) is expensive to buy/install expensive = 0
distance to printer(s)
prone to hacking
often slow due to busy network
cable broken/one terminal down can cause whole system to fail [2]

5 **(a)** any **two** from:
account number/card number
sort code/branch code/bank code — name = 0
expiry date/start date — money in account = 0
type of card (e.g. visa, master, etc.)
(NOT credit limit, PIN, issue number) [2]

(b) any **two** from:
hologram built into card — PIN = 0
embedded chip containing coded data
signature on back of card — check digit = 0
picture
biometrics
digits on card [2]

(c) any **two** from:
additional security identifier
card could be stolen/forged
to stop people getting money out illegally
acts like a password [2]

6 **(a)** **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]

(b) any **three** from:
redundancies/unemployment/retrenchment
need for re-training/can't use hardware (and software)
expensive to set up/run
may be software problems
errors when transferring data to new system
security of data
deskilling
time to transfer data to new system
can be slow due to parallel running — virus = 0
quality of transferred documents can sometimes be poor [3]

7 any **three** from:
items of user documentation (max: 2 marks): user doc = 0
specimen input
specimen output
manuals/user guide/instructions to operate
troubleshooting/how to deal with errors
sample runs

items of technical documentation (max: 2 marks): tech doc = 0
how to load/run/install software/software requirements (e.g. OS)
how to install hardware/hardware requirements
file structures
input/output screens/documents
testing strategy
decision tables
algorithms/program flowcharts
systems flowcharts/document flow
validation rules
(NOT costs, benefits) [3]

8 **(a)** any **two** from:
most computers now have CD-ROM drives as well as/rather than floppy disk drives
CDs are of better quality/more reliable
CD-ROM less likely to become corrupted
cannot delete/change data on CD-ROMs
would require too many floppy disks to hold program/files/data
cheaper to post out CDs cheaper = 0
faster access
(NOT viruses, capacity of media) [2]

(b) advantages
any **two** from:
faster than normal mail sending images/animation = 0
cheaper than post
easier to do repeat mailings
easier to get proof of confirmation of receipt

disadvantages
any **two** from:
customers may not have an e-mail address
e-mail protocol problems/e-mail server down
attached files too large
can't send original documents
messages may become corrupted
messages may be intercepted/hacking [4]

9 **(a)** Code_ Num [1]

(b) 13504 (-1 mark for each additional answer)
14005 [2]

(c) (Power(W) > 70) OR (Colour = "Silver")
< - - 1 mark - - > <1 mark> < - - 1 mark - - - > [3]

(ignore case and quotes; don't accept 70W)

(d) 14010, 13425, 13416, 13504, 14001, 14005
< - - - - 1 mark - - - - > < - - - - 1 mark - - - - > [2]

10 **(a)** **(i)** anything from row 1 or column A [1]

(ii) any cell from D2:D7 [1]

(iii) any cell from B2:B7 or C2:C7 or E2:E7 or F2:F7 [1]

(b) **(i)** E2/F2 [1]

(ii) highlight G2 move to cell G2
copy/paste in cells G3:G7 drag formula into cells G3:G7
(or the equivalent) [2]

(c) SUM(B2:B7) or B2+B3+B4+B5+B6+B7 or SUM(B2+B3+B4+B5+B6+B7)
[1]

(d) any **two** from:
use of graphs to extend the line for future 6 months graphs = 0
double the totals in row B8 and E8
use formulae in spreadsheet to calculate costs/total costs
based on existing costs [2]

11 **(a)** 150 abnormal reading
400 normal speed
800 high speed
(ignore word "speed" in answer) [3]

(b) any **two** points from:
only data 0 to 9 would register
all other data would give "abnormal reading" message/incorrect response
variable **whole** would not exist
thus **whole** would be zero OR algorithm would crash/fail [2]

12 **(a)** 4
F [2]

(b) (1) 01111110
(2) 01110000 [2]

(c) **(i)** any **one** from:
drivers used to analogue instruments
readings are steadier
more accurate (because of infinite number of positions)
easier to see "trends" in read outs/easier to understand [1]

(ii) any **one** from:
not as easy to read as digital
needs to be interpreted by user
mechanical device more likely to break down/fail [1]

13 **(a)** any **four** points from:
gather data from experts set up user interface = 0
create/design a knowledge base
create/design structure relating items in knowledge base
create/design interrogation technique
create/design the screen outputs/inputs
reference to an inference engine
create/design rule base [4]

(b) any **two** features from:
question and answer dialogue hyperlinks = 0
help facility
coded maps (etc) displayed on screen showing mineral concentrations
multichoice questions or yes/no questions
easy to use input screens/pull down menus/windows/icons [2]

14 **(a)** any **three** from:

pressure sensors — sensor = 0
temperature sensors/thermistor — heater=0
pH/acidity sensor
level sensor — thermocouple = 0
ADC — thermometer = 0
DAC
actuators
(ports, screens, printers = 0) [3]

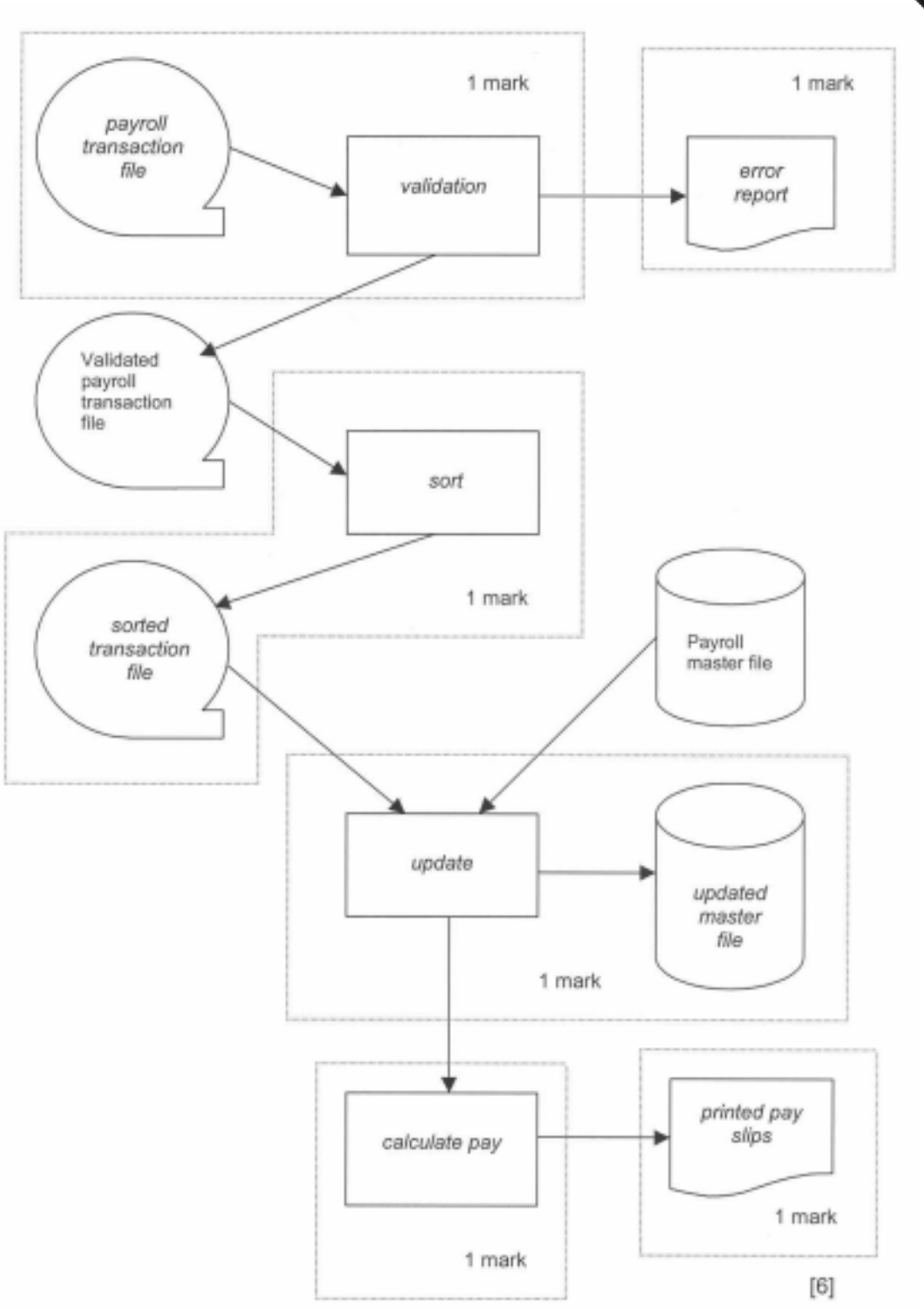
(b) any **two** from:

information about output of a system sent back to computer
to adjust, if necessary, input of system
in such a way that output meets some desired values in memory
compares stored values [2]

(c) any **two** from:

removes human error/increases accuracy
can collect data over long periods of time/automatically
data can be automatically stored and used in other programs
safety considerations (chemical reaction)/hazardous conditions
can be programmed to automatically display reaction status at regular intervals
(costs = 0) [2]

15 Marks should be awarded as shown.



[6]

16 (a)

```
wrong = 0                                              (1 mark)
for count = 1 to 50                                    (1 mark)
        input number                                   (1 mark)
        if number < 1000 or number > 9999              (2 marks)
            then wrong = wrong + 1                     (1 mark)
        endif
next count
percent = wrong * 2                                    (1 mark)
output wrong, percent                                  (1 mark)
```

(accept flow charts but not essays) [6]

(**General answer:**

Initialise variables	– 1 mark
Loop control	– 1 mark
Input number	– 1 mark
Check numbers in range	– 2 marks
Increment incorrect numbers total	– 1 mark
Calculate the percentage	– 1 mark
Output totals	– 1 mark)

(b) any **two** validation checks with examples:
length check
example: make sure there are always 4 digits/characters input
character check
example: make sure only numbers are input and not letters
type check
example: 0 decimal places/integer value
(format check, check digit, presence check = 0)
(example must tie up with validation check for second mark and conversely) [4]