

NCC EDUCATION

**INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES**

COMPUTER TECHNOLOGY

3RD SEPTEMBER 2006

MARKING SCHEME

Markers are advised that many answers in Marking Schemes are **examples only** of what we might expect from candidates. Unless a question **specifically states** that an answer is demanded in a particular form, then an answer that is correct, factually or in practical terms, must be given the available marks.

If there is doubt as to the correctness of an answer the relevant NCC textbook should be the first authority.

This Marking Scheme has been prepared as a guide only to markers. This is **ABSOLUTELY NOT** a set of model answers; **NOR** is the Marking Scheme exclusive, for there will frequently be alternative responses which will provide a valid answer.

Notice to Markers

Where markers award half marks in any part of a question they should ensure that the total mark recorded for a question is a whole mark.

SECTION A - 1
ANSWER ALL QUESTIONS FROM THIS SECTION EACH QUESTION REQUIRES ONE RESPONSE ONLY

For each question enter ONE capital letter ONLY in your answer booklet.

QUESTION 1 1

Answer A

Answer A

Answer C

Answer *D*

Answer B

Answer C

Answer D

QUESTION 8

1

Which of the following business activities is best suited to batch processing?

- A) Sales enquiries
- B) Software development
- C) Payroll processing
- D) Airline reservations

Answer C

QUESTION 9

1

Which of the following two's complement binary numbers is negative?

- A) 10110111
- B) 01101001
- C) 01111111
- D) 00000001

Answer A

QUESTION 10

1

In the OSI model of data communications, which layer detects errors occurring in the physical layer?

- A) Network layer
- B) Session layer
- C) Applications layer
- D) Data link layer

Answer D

Total 10 Marks

SECTION A – 2

**ANSWER ALL QUESTIONS FROM THIS SECTION
EACH QUESTION REQUIRES MORE THAN ONE RESPONSE**

QUESTION 11

3

Which THREE of the following business activities are **primary** activities?

- A) inbound logistics
- B) human resource management
- C) technological development
- D) operations
- E) service
- F) procurement

Answer A), D), E)

3 points, 1 mark each

QUESTION 12

3

Which THREE of the following are examples of systems software?

- A) editor
- B) spreadsheet
- C) interpreter
- D) linker
- E) payroll processing
- F) autopilot

Answer A), C), D)

1 mark each, maximum 3marks

QUESTION 13

3

The top management of a company requires information that has which THREE of these characteristics?

- A) formal
- B) well structured
- C) regular
- D) ad hoc
- E) uncertain
- F) concerned with the future

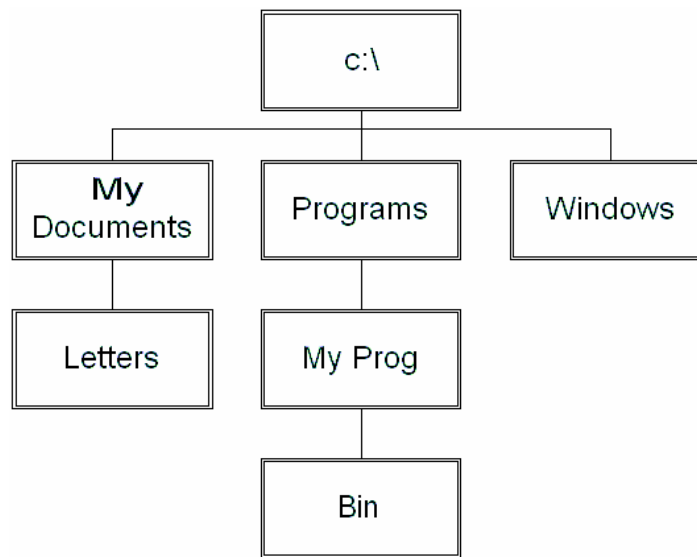
Answer D), E), F)

1 mark each maximum 3 marks

QUESTION 14

3

The following diagram shows a number of directories (folders) in a hierarchical directory system. A file named Module1.exe is stored in a directory.



Which THREE of the following pathways **could** correctly apply to this file?

- A) c:\My Documents\Letters\Module1.exe
- B) c:\Programs\My Prog\Bin\Module1.exe
- C) c:\My Documents\Windows\Module1.exe
- D) c:\Windows\My Documents\Module1.exe
- E) c:\Windows\Programs\Module1.exe
- F) c:\My Documents\Module1.exe

Answer A), B), F)

1 mark each max 3

QUESTION 15

3

Which THREE of the following are functions of a computer's operating system?

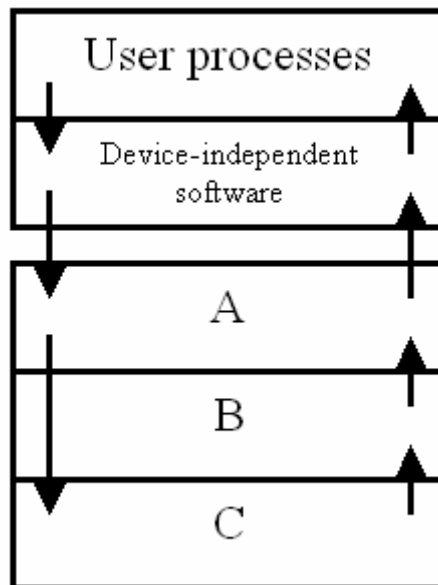
- A) hide the complexities of the machine from the user
- B) hold the data used in calculations
- C) find space in RAM for an application
- D) validate data input into an application
- E) process interrupts
- F) decode HTML tags on websites

Answer A), C), E)

1 mark each, max 3

QUESTION 16

The following diagram shows how different aspects of input and output functionality can be arranged in layers in an operating system.



Identify which component is located at each layer, A, B and C.

Choose from:

- i) device drivers
- ii) hardware
- iii) interrupt handlers

You should write A, B or C after i), ii) and iii) in your answer booklet.

Answer i) A

ii) C

iii) B

1 mark each correct match maximum 3 marks.

QUESTION 17

Convert the following numbers into eight bit two's complement binary numbers.

A) 126

B) -126

C) 64

Answer A) 01111110

B) 10000010

C) 01000000

1 mark each maximum 3marks.

QUESTION 18

3

Convert the hexadecimal number 1F into

- A) eight bit binary
- B) decimal (denary)
- C) Binary Coded Decimal

Answer A) 00011111

B) 31

C) 00110001

1 mark each maximum 3marks.

QUESTION 19

3

Which THREE of the following applications are suitable for connection mode communications?

- A) direct terminal use of a remote computer
- B) file transfer
- C) long term data entry
- D) email
- E) web browsing
- F) music downloads from a website

Answer A), B), C)

1 mark each maximum 3 marks.

QUESTION 20

3

Which THREE of the following are file compression formats commonly used on websites?

- A) jpeg
- B) doc
- C) xml
- D) gif
- E) mpeg
- F) asp

Answer A), D), E)

1 mark each maximum 3 marks.

Total 30 Marks

SECTION B
ANSWER ANY THREE QUESTIONS

QUESTION 21**Marks****Throughout the question, please credit any valid alternative point.**

- a) “The internet is an infrastructure, not an application.” State THREE facilities or applications that are provided using the infrastructure of the internet. **3**
- *email*
 - *world wide web / websites*
 - *file transfer (ftp)*
 - *newsgroups*
 - *ecommerce or any example relating to ecommerce*
- 1 mark each, maximum 3 marks.*
- b) An email is sent to fred@nccedu.com.
- i) State the domain name of the recipient of this email. **1**
- *nccedu.com*
- ii) Apart from the recipient’s details state THREE other components of an email message. **3**
- *sender’s address / id / domain*
 - *subject of message*
 - *cc details*
 - *message body*
 - *attachment*
 - *date / time stamp*
- any 3 points, 1 mark each, maximum 3 marks.*
- iii) An email message can be sent as plain text or encoded in HTML. Give TWO reasons why it can be an advantage to send a message as HTML instead of text. **2**
- *HTML allows formatting*
 - *HTML allows graphics*
 - *HTML allows colours*
- any 2 points, 1 mark each maximum 2 marks.*
- iv) Explain what is meant by a protocol. **2**
- *set of rules*
 - *used in communications between devices*
 - *any named example*
- any 2 points, 1 mark each*

- c) i) State THREE ways in which a business can benefit from developing a web-based online presence. 3
There are many possibilities. Example points:
- *reach a wider public*
 - *conduct business any time*
 - *less need for physical premises*
 - *collect data on enquirers*
 - *provide more information on goods / services*
- Any 3 clearly different points, 1 mark each. Reward other equivalent points if reasonable.*
- ii) List SIX difficulties faced by businesses when they set up an online presence. 6
- *security (any mention of)*
 - *example of security issue such as customer credit card security*
 - *other example of security issue such as security of customer / business data*
 - *expense of setting up*
 - *comment on need to hire new staff / use contractor*
 - *expense of maintenance / keeping up to date*
 - *making site easy to navigate*
 - *need to have expertise to make site usable*
 - *reluctance / inability of some customers to use facilities*
 - *some people don't have connections / skills*
- any 6 of these points, 1 mark each*

Total 20 Marks

QUESTION 22**Marks****Throughout the question, please credit any valid alternative point.**

- a) i) Explain what is meant by the term *Multimedia*. 4
- *system for presentation of information / entertainment*
 - *(may be) computer based*
 - *contains a combination of*
 - *text*
 - *graphics*
 - *video / moving graphics*
 - *sound*
- Any 4 points, 1 mark each, maximum 4 marks.*
- ii) List FOUR situations where multimedia is used. 4
- *movie films*
 - *business presentations*
 - *e-learning*
 - *information resources such as encyclopaedias*
 - *advertising*
 - *interactive information displays*
- Any 4 points, 1 mark each, maximum 4 marks.*
- iii) Explain why a multimedia display is sometimes preferred to a live human presentation. 3
- *cheaper than hiring a human presenter*
 - *more consistent than a human presenter*
 - *no danger of leaving things out*
 - *control over content and delivery*
 - *better quality may be possible*
- Any 3 points, 1 mark each.*
- b) i) Explain why files used in multimedia products are often compressed. 3
- *video / graphics / sound files can be very large*
 - *any reasonable numerical estimate such as 1 MB per screen display*
 - *mention of how videos store lots of consecutive screen displays*
 - *much data needs to be stored*
 - *compression saves storage space*
- Any 3 points, 1 mark each.*
- ii) List FOUR disadvantages of compressing multimedia data files. 4
- *detail may be lost*
 - *compression algorithm may work by leaving out certain parts of file*
 - *delayed playback*
 - *time taken to recreate original from compressed data*
 - *recreation often done as presentation proceeds*
- Any 4 points, 1 mark each.*
- iii) Explain the difference between *lossy* and *lossless* compression. 2
- *lossy is where detail that is not needed is discarded during compression*
 - *lossless is where statistics are kept on the compressed data / no reduction in quality*
- 2 points, 1 mark each.*

Total 20 Marks

QUESTION 23**Marks****Throughout the question, please credit any valid alternative point.**

- a) Compare Unicode and ASCII. 4
- *Both are systems for storing characters*
 - *Unicode is 16 bit*
 - *ASCII is 7 bit (accept 8)*
 - *Unicode can store 2^{16} / 65536 / more characters*
 - *ASCII can store 2^7 / 127 characters*
 - *Unicode needed to code for many languages*
- Any 4 points, 1 mark each, maximum 4 marks.*
- b) i) Explain the advantages and disadvantages of storing data in a fixed length record format. 4
- advantages*
- *file space requirements can be predicted*
 - *record positions can be calculated*
 - *records can be accessed faster than in variable length files / quickly*
- disadvantages*
- *space is wasted*
 - *unused space in a record is saved anyway*
 - *may need to vary number of fields*
- Any 4 points, 1 mark each, maximum 4 marks.*
- ii) Compare a serial file with a sequential file. 4
- *both have records arranged one after another / linearly*
 - *serial file is in no particular order / chronological order*
 - *sequential file is in order*
 - *order is usually by key field*
 - *serial file becomes sequential file if it is sorted*
- Any 4 points, 1 mark each, maximum 4 marks.*
- iii) Describe the steps taken to delete a record from a sequential file. 6
- *go to start of file*
 - *read in record*
 - *compare with record key to be deleted*
 - *if record=required record then move to next record*
 - *else write record to new file*
 - *idea of repetition*
 - *idea of continuing until end of file*
- 1 mark each point, maximum 6 marks.*
- iv) Explain why indexed sequential files can be slow to process when there is a high level of activity. 2
- *each time record inserted / deleted*
 - *index(es) need(s) to be rebuilt*
- 1 mark each, maximum 2 marks.*

Total 20 Marks

QUESTION 24**Marks****Throughout the question, please credit any valid alternative point.**

- a) i) State THREE uses that are made of RAM during a typical working session. 3
- *storage of data being processed by program*
 - *storage of intermediate values in calculations*
 - *storage of program instructions*
 - *of program currently being processed / currently held in memory*
 - *storage of data prior to output / input*
- Any 3 points, 1 mark each, maximum 3 marks.*
- ii) Describe TWO activities that may be performed by the Arithmetic Logic Unit (ALU). 4
- *calculation / arithmetic*
 - *example of this e.g. multiplication / addition / subtraction / division*
 - *carries out logical actions*
 - *makes comparisons (between items of data)*
 - *strings or numbers can be compared*
- Any 4 points, 1 mark each, maximum 4 marks.*
- b) i) Explain what is meant by a register. 3
- *memory unit*
 - *high speed*
 - *store data read from memory*
 - *store status / condition*
 - *larger than main memory locations*
 - *may have processing power*
- Any 3 points, 1 mark each, maximum 3 marks.*
- ii) Describe what happens to the contents of the program counter during the *fetch stage* of the fetch-execute cycle. 3
- *program counter holds address of next instruction to be fetched*
 - *contents incremented (after instruction is fetched)*
 - *may be changed to point to other part of program*
 - *following a jump instruction*
- Any 3 points, 1 mark each, maximum 3 marks.*
- c) i) Identify THREE control lines that exist in the control bus of a computer. 3
- *memory write*
 - *memory read*
 - *I/O write*
 - *I/O read*
 - *transfer acknowledge*
 - *bus request*
 - *bus grant*
 - *interrupt request*
 - *interrupt acknowledge*
 - *clock*
 - *reset*
- Any 3 points, 1 mark each, maximum 3marks.*

ii) Explain how the width of the data bus can affect the performance of a computer system.

4

- *data bus carries data / instructions*
 - *width affects size of data item that can be carried*
 - *in one operation*
 - *if data item larger than data bus width, memory may need to be accessed more than once (or reverse argument, i.e. if data bus large enough to accommodate data item, only one access required)*
 - *this slows down performance (or reverse argument)*
- any 4 points, 1 mark each*

Total 20 Marks