NCC EDUCATION

INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES

COMPUTER TECHNOLOGY

5th June 2005

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 should be 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.

Marks

QUESTION 1 **1**

A company manufactures electrical goods. Which one of the following can be regarded as part of the company's primary activities?

A) information systems
B) human resources
C) delivery of its products to the customers
D) research and development

Answer C

QUESTION 2 **1**

Which one of the following IT systems is used at the operational level of a business?

A) a control system
B) an executive support system
C) a management information system
D) a decision support system

Answer A

QUESTION 3 **1**

A computer system that simulates the process of human reasoning is called

A) an expert system
B) a control system
C) a management support system
D) a decision support system

Answer A

QUESTION 4 **1**

A signal from a device or other source, requiring the attention of the processor is

A) a handshake
B) an interrupt
C) a bus request
D) a reset

Answer B

QUESTION 5 **1**

Which of the following is a WORM (write once read many) medium?

A) DVD
B) CD-ROM
C) CD-R
D) CD-RW

Answer C

QUESTION 6 **1**

Which of these items of information in a company could be regarded as *internal*?

A) economic trends
B) technological developments
C) demand for product
D) stock turnover

Answer D

QUESTION 7 **1**

The middle management of an organisation is most likely to require information that is

A) informal
B) occasional
C) regular
D) repetitive

Answer C

Marks

QUESTION 8 **1**

Which of these actions is likely to be carried out by a computer's operating system?

A) allocation of memory to data
B) calculate cash flow in an organisation
C) process a payroll
D) control an automated factory process

Answer A

QUESTION 9 **1**

A real-time operating system is likely to support an application

A) that processes data which has been previously collected
B) that is subject to unpredictable inputs
C) where the data sources are on many different computers
D) where there is a great deal of printed output

Answer B

QUESTION 10 **1**

Which of these is a 16-bit code for storing characters?

A) ASCII
B) ANSI
C) EBCDIC
D) Unicode

Answer D

SECTION A – 2

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

QUESTION 11 **3**

Which THREE of the following are functions of a computer's main memory?

A) storing input data prior to processing
B) storing data currently being processed
C) storing data prior to its being output to an output device
D) storing archived data
E) storing the disk addresses of files
F) storing system settings used during boot-up

Answer A), B), C)
1 mark each

QUESTION 12 **3**

Which THREE of the following are transaction processing systems?

A) payroll
B) stock control
C) computer aided design
D) expert system
E) computer aided learning
F) sales order processing

Answer A), B), F)
1 mark each

Marks

QUESTION 13 **3**

The following are different types of computer memory:

A) RAM
B) ROM
C) EPROM

Match each type of memory with the correct description from **i)** to **vi).**

i) the contents are written electrically and erased optically
ii) the location of program instructions currently being executed
iii) storage inside the processor
iv) the location of the start up (boot up) instructions)
v) the location of an instruction while it is being decoded
vi) non-volatile storage which can be erased electrically

Answer ***A)ii), B)iv) C)i)***
1 mark each

QUESTION 14 **3**

Select the most appropriate printer for each of the following purposes.

A) small scale colour printing at home
B) printing credit card slips which require self-carboning copies
C) large scale high quality black and white output such as a company's business letters

Choose from the following printer types.

i) dot matrix
ii) thermal
iii) daisy wheel
iv) barrel
v) laser
vi) ink jet

Answer ***A)vi), B)i), C)v***
1 mark each

QUESTION 15 **3**

The following industries all require information delivered by computer systems, but they vary a great deal in how reliant they are upon them.

A) travel agent
B) airline
C) mining
D) retail

Place these industries in **ascending** order, so that the one requiring the **least** processed data is first and the one requiring the **most** processed data comes last.

Answer ***LEAST: C, A, D, B :MOST***
all 4 in order = 3 marks
any 3 in order = 2 marks
any 2 in order (once only) = 1 mark

Marks

QUESTION 16 **3**

Convert the following denary numbers into 8-bit twos complement binary.

A) 46
B) -100
C) –1

Answer ***A) 00101110 , B)10011100 , C)11111111***
in each case, only allow if 8 bits are given
1 mark each

QUESTION 17 **3**

Convert the 8-bit binary number 01000001 to

A) hexadecimal
B) octal
C) BCD

Answer ***A) 41 , B)101, C)110101***
ignore leading zeroes
1 mark each

QUESTION 18 **3**

The following are descriptions of different types of files:

A) they always contain data such as a customer file
B) they record events
C) they are a backup in case the working data is destroyed

Match each of these descriptions with the correct type of file from the list below:

i) master file
ii) audit file
iii) security file
iv) transaction file
v) work file
vi) son file

Answer ***A) i, B) iv),C) iii)***
1 mark each

QUESTION 19 **3**

The following are levels in the OSI network reference model:

A) presentation layer
B) physical layer
C) application layer

Match each of these layers to the correct description from the list below:

i) supports orderly data exchange and releases the connection when the exchange is completed
ii) optimises the network resources to provide required performance
iii) allows user's programs to access the network services
iv) provides mechanical and electrical connections
v) ensures that the information content is reliable
vi) provides a means of establishing and terminating connections between open systems

Answer ***A)v, B)iv, C)iii***
1 mark each

Marks

QUESTION 20 **3**

The following are Internet standards:

A) jpeg
B) mpeg
C) Java

Match each of these standards to the correct description from the list below:

i) a multimedia standard that combines sound and moving images
ii) a standard for compressing still images
iii) a free audio streaming standard
iv) a programming language suitable for writing applications that run in browsers
v) allows the correct display of any document
vi) compression standard for audio and moving images

Answer A)ii, B)vi, C)iv)
1 mark each

Total 40 Marks

SECTION B

ANSWER ANY THREE QUESTIONS

QUESTION 21 **Marks**

Throughout the question, please credit any valid alternative point.

a) i) Email is one of the most popular facilities that makes use of the Internet. State THREE other facilities provided via the medium of the Internet. **3**

- ***world wide web / example or description***
- ***file transfer***
- ***newsgroups***
- ***ecommerce / any example***

any 3 points, 1 mark each

ii) Email can be provided by two main methods. Describe each of these methods, making clear the software that is involved. **4**

- ***web based***
- ***uses browser software***
- ***mail is stored on a remote website***

any 2 points

- ***client based***
- ***uses off-line program such as Outlook/Eudora/Pegasus***
- ***mail is stored on user's computer***

any 2 points

iii) Explain ONE advantage of each of the methods described in section (ii). **2**

web based advantage

- ***can be accessed from any connected computer***

1 mark

client based advantage

- ***no significant limits on file size / storage / may have limited facilities / functionality***
- ***fewer security concerns***

either point – 1 mark

b) i) Each computer connected to the Internet has an IP (Internet Protocol) address in the form of a.b.c.d where a, b, c and d are integers from 0 to 255. **1**

How much storage is required for one IP address?

- ***32 bits / 4 bytes***

1 mark

ii) Explain what is meant by a *protocol.* **2**

- ***a set of rules***
- ***that governs the connection of devices***

1 mark each

iii) Explain the purpose of the DNS (Domain Name System) on the Internet. **2**

- ***conversion of domain names / addresses / URLs***
- ***to IP addresses***
- ***IP addresses need not be remembered***

any 2 points 1 mark each

Marks

c) i) State TWO ways that a business can make use of the world wide web to improve its profitability. **2**

- ***advertising***
- ***increase customer base***
- ***taking orders***
- ***communicating with customers / example***
- ***communicating with suppliers / example***

any 2 points, 1 mark each

ii) Explain why customers are sometimes reluctant to do business over the world wide web. **2**

- ***worry about interception of credit card details***
- ***may lead to fraudulent transactions / theft***
- ***worry about the reliability of the business***
- ***may not get the goods / the right goods***
- ***worry about interception of personal details***
- ***privacy issues resulting from this***

any 2 points, 1 mark each

iii) State any TWO reasons why customers may choose to buy books online rather than go to a book shop. **2**

- ***wider choice***
- ***lower prices***
- ***quicker delivery (of items that need to be ordered)***
- ***search facilities (make it easier to find what you are looking for)***
- ***may not have time to go to the shop***

any 2 points, 1 mark each

Total 20 Marks

QUESTION 22 **Marks**

Throughout the question, please credit any valid alternative point.

a) i) Distinguish between a sector, a track and a cylinder of a hard disk. **6**

sector

- ***a subdivision of a track (can be shown as labelled diagram)***
- ***the smallest part of a disk that can be read in one operation***

1 mark each to a total of 2 marks

track

- ***a complete circle on a disk (can be shown as labelled diagram)***
- ***(large) number of tracks on disk***
- ***tracks are concentric***

any 2 points, 1 mark each

cylinder

- ***a number of tracks***
- ***on separate disk surfaces (can be shown as labelled diagram)***
- ***in same position***

any 2 points, 1 mark each

ii) When data is required to be read from a disk, there is a delay. Describe the THREE main causes of this delay. **3**

- ***(seek time) time taken for the read-write head to be positioned over the correct track***
- ***(rotational delay) time taken for the correct sector to rotate to position of read-write head***
- ***(data transfer delay) time taken for the required data to be read by the read-write head***

1 mark each <u>description,</u> max 3 – no marks for just naming the delays

iii) Memory sticks (USB drives) are rapidly replacing floppy disks as a means for transferring data from one computer to another. State THREE reasons why they are preferred. **3**

- ***high capacity***
- ***fast data transfer times***
- ***robust / less affected by magnetic fields***
- ***small – easily portable***

In all cases, accept the converse regarding floppy disks

1 mark per point max 3

iv) Compare and contrast the way that data is written to a CD with how it is written to a magnetic disk. **4**

CD

- ***uses laser / optical technology***
- ***spiral track***
- ***data written as pits / distortions of the plastic / bleaching a dye***

any 2 points, 1 mark each

magnetic

- ***disk surface made of magnetisable material***
- ***coil in read-write head generates magnetic field***
- ***areas of disk surface magnetised in one direction or another***
- ***tracks concentric***

any 2 points, 1 mark each

Marks

b) i) Explain what is meant by the **resolution** of a screen. **2**

- ***number of dots / pixels***
- ***in given area***
- ***affects clarity of image / more dots – clearer image***

any 2 points, 1 mark each

ii) Explain why the scan rate (refresh rate) is of importance when choosing a computer monitor. **2**

- ***scan rate determines how often the picture is renewed***
- ***if too slow, this causes flicker / high rate (>60 Hz) needed for steady picture***

1 mark each, max 2

Total 20 Marks

QUESTION 23 **Marks**

Throughout the question, please credit any valid alternative point.

a) i) State THREE elements that must be present for a presentation to be described as multimedia. **3**

- ***text***
- ***video***
- ***audio***
- ***graphics / still pictures***
- ***animations***

any 3 points, 1 mark each

ii) Multimedia presentations are increasingly distributed on CDs or DVDs. Explain why these media are particularly suitable for this purpose. **2**

- ***multimedia presentations contain very large files***
- ***CDs and DVDs have high storage capacity***
- ***CDs and DVDs are robust / portable media***

any 2 points, 1 mark each

iii) A multimedia presentation that is run straight from a CD sometimes suffers a slight delay before it is displayed. Explain why this can happen. **3**

- ***elements such as visuals / movies are compressed***
- ***must be decompressed before display***
- ***decompression takes time***
- ***large files take time to read into memory***

any 3 points, 1 mark each

iv) State THREE reasons why a multimedia presentation can be considered a good way to deliver a sales message. **3**

- ***more impact than spoken word***
- ***interactivity promotes retention / remembering of the message***
- ***the presentation will be consistent / the same whenever it is given***
- ***it is convenient to show the presentation at a suitable time or place***
- ***a human presenter gets tired***
- ***copies easily made for distribution***

any 3 points, 1 mark each

b) When preparing a multimedia presentation, additional input peripherals may be required as well as a keyboard and mouse. State TWO extra peripherals that may be required and explain why they may be needed. **4**

- ***scanner***
- ***to digitise images***

- ***digital camera***
- ***to capture images***

- ***microphone***
- ***to capture sound***

1 mark per peripheral, 1 mark each, max 2; 1 mark per reason, 1 mark each, max 2

Marks

c) Explain why the Windows operating system is suitable for running multimedia applications. **5**

- ***multimedia depends on graphic displays***
- ***Windows provides GUI***
- ***Windows provides support for DVDs***
- ***Windows has 32-bit file allocation table***
- ***32-bit FAT supports larger disk drives***
- ***larger disk drives important because multimedia files are large***
- ***Windows supports USB ports***
- ***USB ports important for easily attaching a variety of display (and input) peripherals***
- ***Windows supports multitasking***
- ***multitasking useful if display requires simultaneous outputs from more than one program***

any 5 points, 1 mark each

Total 20 Marks

QUESTION 24 **Marks**

Throughout the question, please credit any valid alternative point.

a) i) Explain what is meant by a *serial file.* **2**

- ***records arranged one after another***
- ***no particular order / chronological order***

1 mark per point to a maximum of 2 marks

ii) Explain how a particular record is located in a serial file. **3**

- ***start at the beginning***
- ***examine each record***
- ***until the required record is found***

1 mark per point to a maximum of 3 marks.

iii) Explain how a sequential file differs from a serial file. **2**

- ***a sequential file is stored in order***
- ***based on some field***
- ***such as key field / example***

any 2 points, 1 mark each

iv) State the steps used to search for a record in a sequential file using the binary search (binary chop) method. **4**

- ***read the middle record***
- ***compare the key with that being searched***
- ***if key = key searched for then found***
- ***else if the required key is larger than the one found***
- ***repeat search in top half of file***
- ***else repeat search in bottom half of file***

any 4 points, 1 mark each

b) i) State THREE reasons why organised databases are preferred to simple data filing systems. **3**

databases provide

- ***integrated view of the data***
- ***non-redundancy of data***
- ***independence of data from the software***
- ***improved security***

any 3 points, 1 mark each

ii) Distinguish between the external schema, the conceptual schema and the internal schema of a database. **3**

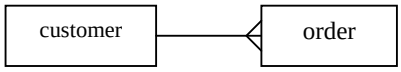
- ***external – user view / what the user sees / may vary between users***
- ***conceptual – database developer's view / logical view / how the tables and other database components are arranged***
- ***internal – how the data is physically written to disk / transparent to user***

1 mark each, total 3 marks

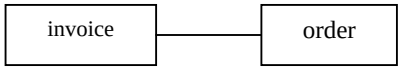
Marks

c) A customer can order many different products from a company. Each time an order is placed, an invoice is produced.

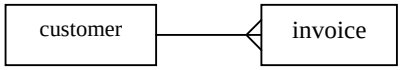
i) Draw a diagram showing the relationship between the entity Customer and the entityOrder in a database design. **1**



ii) Draw a diagram showing the relationship between the entity Order and the entityInvoice in a database design. **1**



iii) Draw a diagram showing the relationship between the entity Customer and the entity Invoice in a database design.. **1**



Total 20 Marks

Specification Grid IDCS CT June 2005

Section A1	Obj A	Obj B	Obj C	Obj D	Obj E	Obj F	Obj G	Obj H	Obj I	Page reference "Computer technology" (NCC Education Ltd, 2001)
Q1	1									8
Q2	1									13
Q3	1									20
Q4		1								49
Q5			1							65
Q6				1						95
Q7				1						96
Q8					1					113
Q9					1					121
Q10						1				155
total A1	**3**	**1**	**1**	**2**	**2**	**1**	**0**	**0**	**0**	**10 marks**
Section A2	Obj A	Obj B	Obj C	Obj D	Obj E	Obj F	Obj G	Obj H	Obj I	page reference
Q11		3								38
Q12	3									29
Q13		3								46
Q14			3							81
Q15				3						98
Q16						3				152 et seq
Q17						3				152 et seq
Q18						3				159
Q19							3			197
Q20								3		224
total A2	**3**	**6**	**3**	**3**	**0**	**9**	**3**	**3**	**0**	**30 marks**
total Section A	**6**	**7**	**4**	**5**	**2**	**10**	**3**	**3**	**0**	**40 marks**
Section B	Obj A	Obj B	Obj C	Obj D	Obj E	Obj F	Obj G	Obj H	Obj I	page reference
Q21a)i), ii), iii)								9		225
Q21b)i), ii), iii)								5		222
Q21c) i), ii)								4		231
Q21c) iii)								2		235
Q22a) i)			6							60
Q22a) ii)			3							61
Q22a) iii)			3							64
Q22a) iv)			4							59
Q22 b) i), ii)			4							77 – 78
Q23a) i)									3	241
Q23a) ii)									2	245
Q23a) iii)									3	247
Q23a) iv)									3	249
Q23b)			4							73 et seq
Q23c)					5					141
Q24a)i)						2				161
Q24a)ii)						3				161
Q24a)iii)						2				161
Q24a)iv)						4				162
Q24b)i)						3				170
Q24b)ii)						3				174
Q24c)						3				175
total B	**0**	**0**	**24**	**0**	**5**	**20**	**0**	**20**	**11**	

