NCC EDUCATION

INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES

COMPUTER TECHNOLOGY

4TH March 2007

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 Education 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.

<u>Notice to Markers</u>

Where markers award half marks in any part of a question they should ensure that the <u>total</u> mark recorded for a question should be a whole mark.
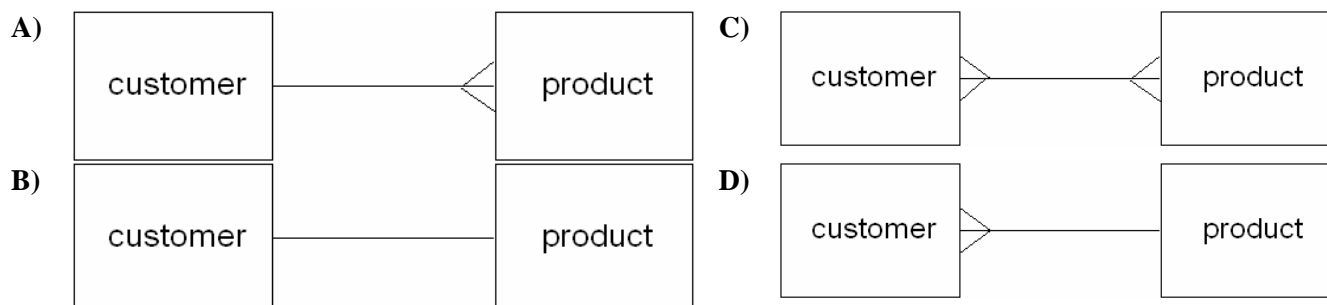
For each question enter ONE capital letter ONLY in your answer booklet.

Marks

QUESTION 1   **1**

In a mail order company, a customer can make many orders. An order can be made up from many products. The relationships between customers and products is shown in which of these diagrams?

A) [customer — product]   C) [customer — product]

B) [customer — product]   D) [customer — product]

Answer   C

QUESTION 2   **1**

A computer system that is used to discover the faults in a car engine by asking a series of questions is called

A)   a decision support system   **C)**   a control system

B)   a transaction processing system   **D)**   an expert system

Answer   D

QUESTION 3   **1**

Many companies have an internal, locally based information system that uses the same technologies as the world wide web. A web browser is used to display the data. Such a system is called

A)   a virtual private network   **C)**   a local area network

B)   an intranet   **D)**   a distributed system

Answer   B

QUESTION 4   **1**

Which of the following is an optical storage medium?

A)   A memory stick   **C)**   A DVD

B)   A floppy disk   **D)**   A hard disk

Answer   C

QUESTION 5   **1**

Which of the following is a description of data?

A)   Encoded information   **C)**   Knowledge

B)   Processed information   **D)**   Output

Answer   A

QUESTION 6   **1**

A network point that acts as an entrance to another network is called

A)   a hub   **C)**   a gateway

B)   a switch   **D)**   a terminator

Answer   C

QUESTION 7 1

Which of the following is a system that passes a stream of signals that may or may not contain data to each computer on the network?

A) Ethernet   **C)** Bus
B) Token ring   **D)** UTP

Answer   B

QUESTION 8 1

A network interface card operates at which level of the OSI seven layer network model?

A) 1   **C)** 3
B) 2   **D)** 4

Answer   A

QUESTION 9 1

Which of the following is a sound compression standard?

A) JPEG   **C)** MP3
B) GIF   **D)** MPEG

Answer   C

QUESTION 10 1

Which of the following could be a multimedia product?

A) An MP3 download   **C)** A podcast
B) A DTP document   **D)** A MIDI file

Answer   C

Total 10 Marks

SECTION A – 2
ANSWER ALL QUESTIONS FROM THIS SECTION
EACH QUESTION REQUIRES MORE THAN ONE ANSWER

QUESTION 11 3

Which THREE of the following business activities are concerned with inbound logistics?

A) material handling
B) warehousing
C) machining
D) vehicle scheduling
E) packaging
F) assembly

Answer   A), B), D)
         3 points, 1 mark each

QUESTION 12 3

In a relational database, which THREE of the following statements are true?

A) tables are linked by key fields
B) every table has a foreign key
C) every row in a table must be in the same format
D) every field must be the same data type
E) the only data that is operated on is in tables
F) indexing tables is not possible

Answer   A), C), E)
         3 points, 1 mark each

QUESTION 13 3

The following are actions occurring in a network:

A) release of a connection

B) correction of errors in the signals

C) conduction of signals

Match these actions with the correct layer of a network where they occur.

i) network layer

ii) session layer

iii) data link layer

iv) application layer

v) physical layer

vi) presentation layer

Answer   A) = (ii)

            B) = (iii)

            C) = (v)

            1 mark each max 3

QUESTION 14 3

Which THREE of the following statements about teleworking are **true**?

A) it always requires the use of a modem

B) it can decrease traffic congestion

C) it allows flexible working times

D) it can reduce social interaction

E) it increases a company's staff expenses

F) it requires workers to live close to the office

Answer   B), C), D)

            1 mark each max 3

QUESTION 15 3

Which THREE of the following are control lines of a processor's control bus?

A) memory write

B) memory clear

C) flag read

D) bus request

E) reset

F) program counter reset

Answer   A), D), E)

            1 mark each, max 3

QUESTION 16 3

Which THREE of the following are outputs from a payroll system?

A) holiday records

B) reports on print runs

C) cheques

D) bank transfers

E) tax tables

F) appraisal records

Answer   B), C), D)

            1 mark each, max 3

QUESTION 17   **3**

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

A) 65

B) –12

C) 47

Answer   A) 01000001

B) 11110100

C) 00101111

1 mark each max 3

QUESTION 18   **3**

Which THREE of the following are types of information about internal company performance?

A) sales forecasts

B) personnel

C) stock turnover

D) economic trends

E) demand

F) competitor performance

Answer   A), B), C)

1 mark each max 3

QUESTION 19   **3**

Which THREE of the following are components of a data packet?

A) source address

B) protocol

C) route taken

D) packet number

E) data

F) computer platform

Answer   A), D), E)

1 mark each max 3

QUESTION 20   **3**

Which THREE of the following are internet protocols?

A) TCP

B) HTML

C) HTTP

D) UTP

E) FTP

F) PDF

Answer   A), C), E)

1 mark each max 3

Total 30 Marks

QUESTION 21   **Marks**

<mark>Throughout the question, please credit any valid alternative point.</mark>

a)   In the context of IT, explain the meaning of a *system*.   **6**
- *collection of parts / components*
- *acting together*
- *has an objective*
- *requires input*
- *produces an output*
- *carries out process(es)*
- *may contain sub-systems*

1 mark each, max 6

b)   i)   In a business context, explain what is meant by *procurement*.   **2**
- *the purchasing of items*
- *the items are used as inputs in the business's value chain*

1 mark each point, max 2

   ii)   State THREE activities carried out by a human resource department.   **3**
- *recruitment*
- *hiring staff*
- *training staff*
- *developing staff*
- *compensating / paying staff*

any 3 points, 1 mark each, max 3

c)   i)   Describe the relationships between a company's business strategy, information systems strategy and   **4**
information technology strategy.
- *the business strategy is determined by what the company wants to do*
- *it depends on opportunities / constraints*
- *business strategy determines its IS strategy*
- *IS strategy is the provision of systems that will assist the business strategy*
- *IS strategy determines IT strategy*
- *the technology must support the required IS*

any 4 points, 1 mark each, max 4

   ii)   Explain what is meant by a *transaction processing system.*   **2**
- *performs / records routine operations*
- *these are regular events*
- *records are stored as they happen / in chronological order*

any 2 points, 1 mark each, max 2

   iii)   State THREE business activities that are likely to make use of a transaction processing system.   **3**
examples (any recurring tasks):
- *payroll*
- *sales*
- *orders*
- *bookings*
- *reservations*
- *information provision / enquiries*
- *maintenance operations*
- *employee record keeping*
- *shipping*

any 3 points, 1 mark each, max 3

Total 20 Marks

QUESTION 22   **Marks**

Throughout the question, please credit any valid alternative point.

a)   i)   State THREE uses for primary storage during the execution of a program.   **3**
- *storage of program instructions*
- *storage of data being processed*
- *temporary store of data being input*
- *temporary store of data before output*

any 3 points, 1 mark each, max 3

     ii)   The processor contains a component called the Arithmetic Logic Unit. Explain the meaning of LOGIC   **3**
in this context.
- *refers to Boolean logic*
- *the process of making comparisons*
- *determination of whether data values are equal / greater / lesser than each other*
- *enables actions to be taken as a result*

any 3 points, 1 mark each, max 3

b)   i)   The processor contains a number of registers. Explain what a *register* is.   **3**
- *memory unit*
- *operate at high speed*
- *larger than main memory locations*
- *some store data taken from memory*
- *some are the site of data processing operations*

any 3 points, 1 mark each, max 3

     ii)   Describe the stages of the fetch-execute cycle **and** how the contents of registers change during this   **6**
process.
- *program counter stores address of next instruction to be fetched*
- *address is transferred to the memory address register*
- *instruction is retrieved into the memory data register*
- *instruction is passed to the instruction register*
- *instruction is decoded*
- *instruction is executed*
- *data may be read from RAM into accumulator*
- *data enters / exits processor via the memory data register*
- *data may be changed in the accumulator*
- *program counter is incremented*
- *program counter is reset after a jump instruction*

any 6 points, 1 mark each, max 6

iii) Explain the significance of the system clock in the running of a program. **2**
- *clock speed determines speed of program execution*
- *clock coordinates actions*
- *clock determines when operation is carried out*
- *may take many clock cycles to process instruction*

any 2 points, 1 mark each, max 2

iv) A particular CD-ROM has a capacity of 700 Mb. Calculate how many would be needed to back up a hard drive of 80 Gb capacity. Show your working. **3**
- *80 Gb = 80 * 1024 Mb*
- *80 Gb = 81920 Mb*
- *Number of CD ROMs required = 81920 / 700*
- *Number of CD ROMs required = 118 (accept 117)*

Any 3 points, 1 mark each, max 3

Total 20 Marks

QUESTION 23   **Marks**

a) i) Explain the difference between operating systems and applications.   **2**
- *OS manages the hardware*
- *applications solve users' problems*
1 mark each, max 2

ii) Explain why systems software is more likely to be mass-produced than an application.   **4**
- *systems software is very complex*
- *systems software is expensive to produce*
- *not worthwhile to produce systems software for a small number of customers*
- *applications can be developed more cheaply*
- *plenty of tools for making applications easily*
any 4 points, 1 mark each, max 4

b) i) Explain what is meant by a batch-processing operating system.   **2**
- *jobs are collected together*
- *jobs are then processed without human intervention*
1 mark each, max 2

ii) List THREE business activities that are suitable for batch processing.   **3**
Examples (reward other suitable responses):
- *payroll*
- *cheque processing*
- *any bill processing*
- *any order processing*
- *any intensive calculation situation*
- *data backup / archiving*
Any 3 points, 1 mark each, max 3

c) i) Explain what is meant by *multiprogramming.*   **2**
- *apparent simultaneous execution of more than one program*
- *held in memory at the same time*
1 mark each, max 2

ii) State FOUR objectives of a multiprogramming operating system.   **4**
- *minimise elapsed time*
- *ensure fair sharing of resources*
- *reduce incidence of peripheral-bound operations*
- *minimise unused CPU time*
- *prevent single programs dominating CPU*
Any 4 points, 1 mark each, max 4

iii) State THREE requirements of a real-time operating system.   **3**
- *they must deal with unpredictable events*
- *they must deal with parallel / simultaneous activities*
- *they may have to be fail-safe*
- *they have to support non-sequential processes*
- *they must provide a response within a short period of time*
Any 3 points, 1 mark each, max 3

Total 20 Marks

QUESTION 24   **Marks**

<mark>**Throughout the question, please credit any valid alternative point.**</mark>

a)   i)   In terms of data processing, define an *entity*.   **2**
- *a real world object*
- *something about which we store data*
1 mark each, max 2

     ii)   Define an *attribute* of an entity.   **2**
- *a description / characteristic of an entity*
- *identifies an entity*
1 mark each, max 2

b)   i)   Define an *integer.*   **1**
- *a whole number*
1 mark

     ii)   Explain what is meant by a *two's complement binary number.*   **3**
- *number made from binary digits*
- *most significant bit is negative*
- *if MSB is 1, then number is negative*
3 points, 1 mark each, max 3

     iii)   Explain how a floating-point number is stored in computer memory.   **3**
- *number is in two parts*
- *mantissa*
- *exponent*
- *stored separately*
Any 3 points, 1 mark each, max 3

c)   i)   Describe the relationship between a file, a record and a field.   **3**
- *a file is a collection of records*
- *a record is a group of fields*
- *a field is a data item in a record*
1 mark each, max 3

     ii)   Explain the advantage of storing data in fixed length records.   **2**
- *file size is predictable*
- *record can be found quickly*
- *by calculation*
any 2 points, 1 mark each, max 2

     iii)   Explain the term *master file*.   **2**
- *main file*
- *contains organization's most important data*
- *always contains data*
- *needs periodic updating*
any 2 points, 1 mark each, max 2

     iv)   Explain the term *transaction file*.   **2**
- *contains records of events*
- *placed in chronological order*
- *used to update master file*
any 2 points, 1 mark each, max 2

                                       Total 20 Marks