



NCC EDUCATION

INTERNATIONAL DIPLOMA

IN

COMPUTER STUDIES

COMPUTER TECHNOLOGY

1ST MARCH 2009

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.

Throughout the question, please credit any valid alternative point.

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 rounded up to a whole mark.

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

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

QUESTION 1

1

Which of the following involves a transaction processing system?

- | | |
|----------------------------------|---------------------------------|
| A) controlling a washing machine | C) withdrawing cash from an ATM |
| B) playing a DVD | D) an autopilot |

Answer C

QUESTION 2

1

A computer system uses a knowledge base and inference engine to diagnose engine problems in a car. This system is an example of

- | | |
|--------------------------------|------------------------------------|
| A) an engine management system | C) an expert system |
| B) a control system | D) a management information system |

Answer C

QUESTION 3

1

Which of the following provides wireless communications over long distances?

- | | |
|----------|---------|
| A) WiFi | C) ISDN |
| B) WiMAX | D) ADSL |

Answer B

QUESTION 4

1

Which of the following is an object oriented programming language?

- | | |
|----------------------|----------|
| A) C++ | C) BASIC |
| B) assembly language | D) Perl |

Answer A

QUESTION 5

1

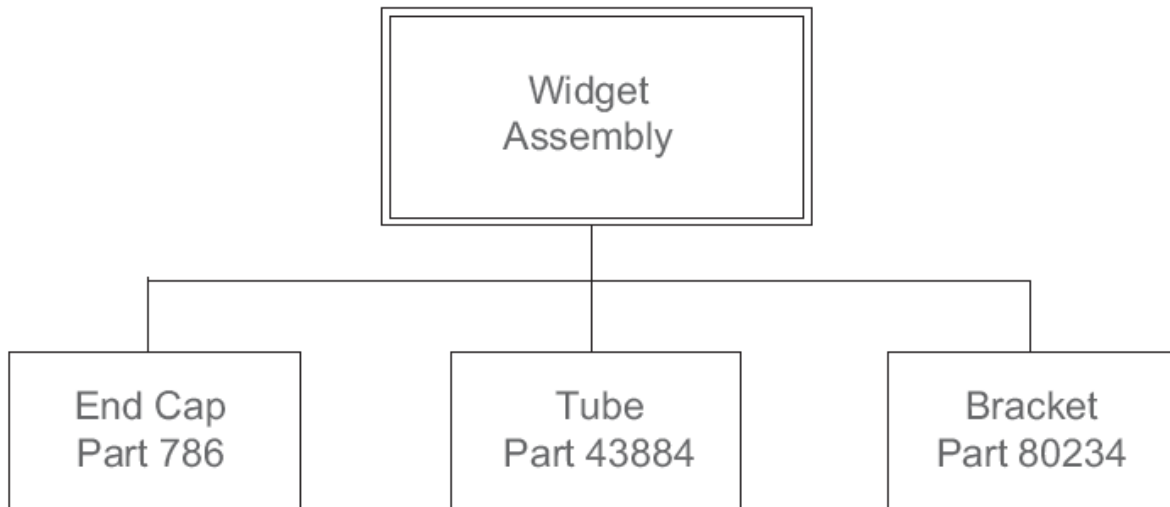
Which of the following sound file formats encodes each musical note separately, along with its length and instrument playing it?

- | | |
|---------|---------|
| A) MPEG | C) WAV |
| B) MP3 | D) MIDI |

Answer D

QUESTION 6**1**

The diagram below shows part of a database.



The data model shown is

- A) relational
- B) hierarchical
- C) flat file
- D) network

Answer B

QUESTION 7**1**

Which of the following provides a user friendly interface to a database system?

- A) reports
- B) queries
- C) forms
- D) tables

Answer C

QUESTION 8**1**

A web resource is located at <http://www.bbc.co.uk/programmes/b00f4rjm>. The domain name for this resource is

- A) http
- B) bbc.co.uk
- C) programmes
- D) b00f4rjm

Answer B

QUESTION 9**1**

The minimum number of satellites that needs to be accessed by a GPS receiver in order to establish a location is

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

Answer C

QUESTION 10**1**

Which of the following allocates textual names to web resources?

- A) TCP
- B) DNS
- C) FTP
- D) UDP

Answer B

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

QUESTION 11**3**

Which THREE (3) of the following are inbound logistic activities in a business?

- A) inventory control
- B) assembly
- C) distribution
- D) repair
- E) warehousing
- F) vehicle scheduling

Answer a), e), f)

3 points, 1 mark each

QUESTION 12**3**

Which THREE (3) of the following activities of a business create value for a customer and can be described as direct?

- A) assembly
- B) maintenance
- C) inspection
- D) machining
- E) testing
- F) sales force operation

Answer a), d), f)

3 points, 1 mark each

QUESTION 13**3**

Which THREE (3) of the following actions are the responsibilities of the session layer in the OSI seven layer model for networks?

- A) detects errors that occur in the physical layer
- B) coordination between two presentation entities
- C) supports orderly data exchange
- D) provides electrical connectivity
- E) release of a connection in an orderly manner
- F) optimising the use of the available network services

Answer b), c), e)

1 mark each max 3

QUESTION 14**3**

Which THREE (3) of the following are components of a data packet transmitted on a network?

- A) operating system used by sender
- B) packet number
- C) checksum
- D) destination address
- E) application used to create the data
- F) packet size

Answer b), c), d)

1 mark each max 3

QUESTION 15**3**

Which THREE (3) of the following activities are part of the business analysis phase of systems development?

- A) planning work schedules
- B) enterprise analysis
- C) requirements planning
- D) requirements analysis
- E) allocation of resources
- F) assigning tasks

Answer b), c), d)

1 mark each, max 3

QUESTION 16**3**

Which THREE (3) of the following are benefits of using the MP3 format of sound file storage?

- A) the quality is better than an audio CD
- B) they use lossless compression
- C) they allow the playing of music on a computer
- D) it is not necessary to decompress when playing them
- E) they allow a CD to contain more music than a traditional audio CD
- F) they can be downloaded quickly from the internet

Answer c), e), f)

1 mark each, max 3

QUESTION 17**3**

Which THREE (3) of the following statements about SQL are true?

- A) it is a data manipulation language
- B) it is an object oriented language
- C) it is a data definition language
- D) it is a data query language
- E) it is a functional language
- F) it is a low level language

Answer a), c), d)

1 mark each max 3

QUESTION 18**3**

Which THREE (3) of the following are features of data mining?

- A) data classification
- B) cluster analysis
- C) data verification
- D) data validation
- E) data updating
- F) regression analysis

Answer a), b), f)

1 mark each max 3

QUESTION 19**3**

Which THREE (3) of the following can be regarded as examples of systems software?

- A) a linker
- B) an interpreter
- C) a loader
- D) a control program for a microwave oven
- E) a calculator
- F) a booking system

Answer a), b), c)

1 mark each max 3

QUESTION 20**3**

Which THREE (3) of the following are stages in the SSADM software engineering methodology?

- A) investigation of current environment
- B) maintenance
- C) logical design
- D) testing
- E) coding
- F) definition of requirements

Answer a), c), f)

1 mark each max 3

Total 40 Marks

SECTION B
ANSWER ANY <u>THREE</u> QUESTIONS

QUESTION 21
Marks

Throughout the question, please credit any valid alternative point.

- | | | | |
|----|------|---|----------|
| a) | i) | State the main purposes of an operating system. <ul style="list-style-type: none"> • <i>to hide the complexities of the hardware from the user</i> • <i>to manage the hardware resources</i> • <i>to allocate memory</i> • <i>to allocate access to the processor</i> • <i>to control peripherals</i> <i>Any 4 points, 1 mark each, max 4.</i> | 4 |
| | ii) | Describe the purpose of a linker. <ul style="list-style-type: none"> • <i>linker used to combine object code modules</i> • <i>linker produces single executable file</i> • <i>linker produces single symbol table / or suitable description of rationalising variables / names</i> <i>Any 2 points, 1 mark each, max 2.</i> | 2 |
| | iii) | Explain what is meant by batch processing. <ul style="list-style-type: none"> • <i>series of jobs set up</i> • <i>set of data set up</i> • <i>programs executed one after another</i> • <i>records processed one after another</i> • <i>no human intervention</i> <i>Any 3 points, 1 mark each, max 3.</i> | 3 |
| | iv) | Explain what is meant by a multiprogramming operating system. <ul style="list-style-type: none"> • <i>one which allows more than one program to apparently execute at the same time</i> • <i>more than one program held in memory at the same time</i> <i>2 points, 1 mark each, max 2.</i> | 2 |
| | v) | State FOUR (4) objectives of a multiprogramming operating system. <ul style="list-style-type: none"> • <i>reduce unused CPU time</i> • <i>reduce incidence of peripheral-bound operations</i> • <i>minimise total elapsed time</i> • <i>prevent single programs from dominating the CPU</i> <i>4 points, 1 mark each, max 4.</i> | 4 |

- b) i) State THREE (3) requirements of a real-time operating system. **3**
- *to support processes that are non-sequential in nature*
 - *to deal with a number of events that happen in parallel / at unpredictable moments*
 - *to carry out a process and respond in a limited time*
 - *to operate reliably in a fail safe mode in safety critical situations*
- Any 3 points, 1 mark each, max 3.*
- ii) State TWO (2) applications that require the use of a real-time operating system. **2**
- Examples: (reward other correct answers)*
- *any booking system*
 - *any process control system*
 - *any control system such as engine management / autopilot*
 - *computer game*
- Any 2 points, 1 mark each, max 2.*

Total 20 Marks

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

- a) i) Explain what is meant by a *layered model* of network design. 4
- *parts of the network can be treated separately*
 - *a layer is a collection of functions*
 - *these functions communicate with the adjacent layers*
 - *a layer receives services from the layer below*
 - *a layer provides services for the layer above*
- Any 4 points, 1 mark each, max 4*
- ii) Explain why networks are designed using a layered model such as the OSI seven layer model. 3
- *it allows information to be hidden*
 - *it allows design to focus on one part only*
 - *it allows changes to be made without referencing others parts of the system*
 - *it simplifies design processes*
- Any 3 points, 1 mark each max 3.*
- iii) Explain what is meant by the connectionless mode of data transmission. 4
- *no connection is set up between the sender and the receiver*
 - *there is no finite lifetime for the connection*
 - *the unit of data contains the delivery information*
 - *the data does not travel by a predetermined route*
 - *the data is split up and units of data may travel by different routes*
 - *best use is made of the connections involved*
- Any 4 points, 1 mark each, max 4*
- b) i) Explain what is meant by a LAN. 3
- *local area network*
 - *a network confined to one site*
 - *makes use of privately owned resources*
- 3 points, 1 mark each, max 3*
- ii) State THREE (3) advantages of implementing a LAN using wireless technology. 3
- *cheaper than wired*
 - *more flexible implementation*
 - *no need for building works*
 - *allows notebook computers to be used anywhere*
 - *allows internet connectivity for visitors*
- Any 3 points, 1 mark each, max 3.*
- iii) Explain what is meant by a VPN. 3
- *a private network (virtual private network)*
 - *operates on a shared WAN*
 - *such as the internet*
 - *uses encryption to protect data*
- Any 3 points, 1 mark each, max 3.*

Total 20 Marks

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

- a) i) State the THREE (3) primary objectives of the software design process. 3
- *produce various models*
 - *evaluate models to see if they fulfill the intended purpose*
 - *examine alternatives / trade offs*
 - *plan development activities*
- Any 3 points, 1 mark each point, max 3.*
- ii) Describe the TWO (2) main activities associated with the software design process. 4
- *architectural design*
 - *the top level structure and organisation of the system is described*
 - *components identified*
 - *system is decomposed*
 - *interfaces between components described*
 - *implementation design*
 - *each component is described so that it is ready for coding*
- Any 4 points, 1 mark each, max 4*
- iii) Identify FOUR (4) reasons why software maintenance may be necessary. 4
- *correct errors*
 - *correct design flaws*
 - *improve the design*
 - *make enhancements*
 - *interface with other systems*
 - *convert for use on other hardware*
 - *migrate legacy systems*
 - *retire systems*
- Any 4 points, 1 mark each, max 4*

- b) i) Explain the difference between an organisation's **IS** strategy and its **IT** strategy. **4**
- *IS strategy is concerned with WHAT needs to be done*
 - *IS strategy is concerned with the information and systems needed by the business*
 - *IT strategy is concerned with HOW this needs to be done*
 - *IT strategy is concerned with the technology needed to support the IS*
 - *the IS strategy determines the IT strategy*
- Any 4 points, 1 mark each, max 4.*
- ii) Describe the purpose of a management information system. **3**
- *provides managers with reports*
 - *reports about company performance*
 - *help in planning / decision making*
 - *at management level*
 - *condense information*
 - *information from operation level*
 - *produce summaries / lists problems*
- Any 3 points, 1 mark each, max 3.*
- iii) Explain how the use of EPOS terminals improves the quality of information available to the management of a supermarket. **2**
- *data is collected near the source of activities*
 - *data is current*
 - *this allows better decision making*
 - *data is fed into the supermarket's database*
- Any 2 points, 1 mark each, max 2.*

Total 20 Marks

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

- a) i) Explain why data redundancy is best avoided in a database. 3
- *data is stored more than once in a database*
 - *this leads to unnecessary duplication*
 - *inconsistent data*
 - *data may be updated in one place and not in another*
- Any 3 points, 1 mark each, max 3.*
- ii) Explain what is meant by data integrity. 2
- *reliability of data*
 - *accuracy of data*
- 2 points, 1 mark each, max 2*
- iii) Explain how a DBMS helps to maintain data integrity. 5
- *security features are separate from data handling features*
 - *can limit access to data to authorised personnel*
 - *this allows security options to be updated independently of data handling*
 - *backup is handled consistently*
 - *consistent approach to data handling across the organisation*
 - *features can be applied to prevent redundancy*
- Any 5 points, 1 mark each, max 5.*
- b) i) State THREE (3) rules that apply to the construction of data tables in a relational database. 3
- *every row must be in the same format*
 - *all the data in a column must be of the same type*
 - *some column (or combination of columns) must make every row unique*
 - *primary key (the words themselves) needed*
 - *no assumption is made about the sequence of rows*
- Any 3 points, 1 mark each, max 3.*
- ii) Explain how tables are linked in a relational database. 3
- *the primary key in one table*
 - *matches a foreign key in another table*
 - *the foreign key is not necessarily unique in its table*
- 3 points, 1 mark each, max 3.*
- iii) Explain the principles which a DBMS needs to follow in order to maintain the integrity of a database while changes are being made. 4
- *a change is completely performed or not performed (i.e. atomicity)*
 - *a change must take the database from one consistent state to another (i.e. consistency)*
 - *a change should not become visible to another user or transaction until it is committed (i.e. isolation)*
 - *a change must not be lost (i.e. durability)*
- 4 points, 1 mark each, max 4.*

Total 20 Marks