NCC EDUCATION

INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES

COMPUTER TECHNOLOGY

30TH NOVEMBER 2008

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.

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 <u>total</u> mark recorded for a question should be rounded up to a whole mark.

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

Marks

QUESTION 1 1
Computers and other devices that are connected in a single building make up a
A) WAN **C)** VPN
B) LAN **D)** MAN
Answer   B

QUESTION 2 1
A number is stored in computer memory in three parts, a sign, a mantissa and an exponent. This number is
A) an integer **C)** a byte
B) a floating point number **D)** currency
Answer   B

QUESTION 3 1
Which of these is a file format used for storing moving pictures?
A) JPEG **C)** TIF
B) MPEG **D)** BMP
Answer   B

QUESTION 4 1
Which of these is a network access point that connects one network to another?
A) a hub **C)** a network interface card
B) a router **D)** a gateway
Answer   D

QUESTION 5 1
Which of the following aims to provide wireless data transmission over long distances?
A) WiFi **C)** Bluetooth
B) Wii **D)** WiMAX
Answer   D

QUESTION 6 1
Which of the following can be described as a multi-platform object oriented programming language?
A) Java **C)** Perl
B) Visual Basic **D)** Pascal
Answer   A

QUESTION 7 1
Which of the following is the most suitable form of secondary storage on a sub-notebook computer?
A) floppy disk **C)** solid state flash memory
B) CD-ROM **D)** hard disk
Answer   C

QUESTION 8 1
Which of these is a valid IP address?
A) 256.7.99.8 **C)** 34.54.66.120.12
B) 55.0.88.75 **D)** 65.34.100
Answer   B

QUESTION 9   **1**

Which of the following is most likely to reduce the usability of a multimedia presentation stored on a memory stick?

A) waiting for decompression   **C)** lack of graphics
B) waiting for data transfer   **D)** lack of software to display JPEGs
Answer   A

QUESTION 10   **1**

Which of the following is a component of an expert system?

A) a compiler   **C)** an interpreter
B) a knowledge base   **D)** an integrated development environment
Answer   B

Total 10 Marks

QUESTION 11 3

Which THREE (3) of the following are quality assurance activities?
A) monitoring
B) assembly
C) testing
D) machining
E) reviewing
F) sales force administration
Answer   a), c), e)
3 points, 1 mark each

QUESTION 12 3

Which THREE (3) of the following types of information system are typically used at the operations level in a business?
A) executive support systems
B) management information systems
C) decision support systems
D) knowledge work and automation systems
E) control systems
F) transaction processing systems
Answer   d), e), f)
3 points, 1 mark each

QUESTION 13 3

Which THREE (3) of the following would require real-time processing?
A) printing pay slips
B) processing examination results
C) a computer game
D) an aircraft auto pilot
E) cheque processing
F) a heart monitor
Answer   c), d), f)
1 mark each, max 3marks

QUESTION 14 3

Which THREE (3) of the following statements about hashing are true?
A) it transforms the key field
B) each key field generates a unique disk address
C) it requires no overflow area
D) the disk address of a record is based on the key field
E) it ensures that all related data is stored together on the disk
F) it allows faster searching for a record than sequential access
Answer   a), d), f)
1 mark each, max 3marks

QUESTION 15   3

Which THREE (3) of the following statements apply to hexadecimal numbers?
A)   they save space in computer storage
B)   each digit is equivalent to four binary digits
C)   they can make use of 16 different digits
D)   they can exactly represent binary numbers
E)   they represent data more accurately than binary numbers
F)   they are longer than the equivalent octal numbers
Answer   b), c), d)
         1 mark each, max 3marks

QUESTION 16   3

Which THREE (3) of the following are reasons why some businesses are setting up wireless LANs instead of cabled LANs?
A)   wireless LANs are more secure
B)   wireless LANs provide faster data transfer
C)   wireless LANs provide a more flexible layout
D)   wireless LANs require no configuration
E)   wireless LANs are cheaper to set up
F)   wireless LANs are easy to expand
Answer   c), e), f)
         1 mark each, max 3marks

QUESTION 17   3

Data mining provides which THREE (3) of the following actions?
A)   regression analysis
B)   data entry
C)   cluster analysis
D)   data classification
E)   validation
F)   data protection
Answer   a), c), d)
         1 mark each, max 3marks

QUESTION 18   3

Which THREE (3) of the following actions are likely to make the most demands on the battery of a laptop computer?
A)   transferring data from RAM to the processor
B)   wireless communication
C)   providing the screen display
D)   watching a DVD film
E)   performing a calculation in a spreadsheet
F)   loading a letter from a USB memory stick
Answer   b), c), d)
         1 mark each, max 3marks

QUESTION 19   3

Which THREE (3) of the following are internet protocols?
A)   UDP
B)   TCP
C)   DNS
D)   HTML
E)   PDF
F)   GIF
Answer   a), b), c)
         1 mark each, max 3marks

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

A) it can be accessed from any connected computer
B) it requires the installation of the email client
C) it requires the presence of a web browser
D) it provides more security than client based email
E) it does not allow the sending of binary files as attachments
F) it allows online storage of emails

Answer   a), c), f)
          1 mark each, max 3marks

Total 30 Marks

QUESTION 21   **Marks**

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

A) **i)** Explain the difference between a compiler and an interpreter.   **4**
- *compiler translates whole program in one operation*
- *compiler produces object code*
- *interpreter translates single line then executes it*
- *interpreter may take commands direct from user input*

4 points, 1 mark each, max 4 marks

    ii) Describe how an editor and a linker are used in the creation of a computer program. **4**
- *editor is used to input the source code*
- *editor used to amend/save source code*
- *linker used to combine object code modules*
- *linker produces single executable file*
- *linker produces single symbol table / or suitable description of rationalising variables / names*

Any 4 points, 1 mark each, max 4 marks

B) **i)** Explain what is meant by *multiprogramming*.   **2**
- *the apparent running of more than one program at the same time*
- *all programs held concurrently in memory*

2 points, 1 mark each, max 2

    ii) Explain how partitions are used to allow multiprogramming to take place.   **4**
- *partition is a section of memory*
- *each process / program occupies a partition*
- *operating system keeps track of which process is in which partition*
- *operating system keeps track of the status of each process*

4 points, 1 mark each, max 4 marks

    iii) State the FOUR (4) objectives of a multiprogramming operating system.   **4**
- *minimise unused CPU time*
- *reduce incidence of peripheral-bound operations*
- *minimise total elapsed time*
- *prevent single programs from dominating the CPU*

4 points, 1 mark each, max 4 marks

    iv) Explain how *time-slicing* is used in multiprogramming.   **2**
- *processor time divided into "slices"/short periods*
- *each process has access to the processor during a time slice*
- *control rapidly switched between processes*
- *ideally, fast enough for the user not to be aware of the switch*

Any 2 points, 1 mark each, max 2 marks

Total 20 Marks

QUESTION 22   **Marks**

A) **i)**   Explain what UNICODE is.   **4**
- *a method of encoding characters*
- *in computer storage*
- *uses 16 bits*
- *allows coding for >65000 characters*
- *suitable for all languages*

Any 4 points, 1 mark each, max 4 marks

ii) In terms of data storage, explain what is meant by *an entity*.   **2**
- *a real-world object*
- *about which we store data*

2 points, 1 mark each max 2 marks

iii) Explain the difference between a file and a record.   **4**
- *a file is a group of records*
- *a file is a named data storage unit on secondary storage*
- *a record is information about an entity*
- *a record is made up from fields*
- *a field is one data item*

Any 4 points, 1 mark each, max 4 marks

iv) Explain the advantages of storing data in fixed length record files compared with storing the data **4**
in variable length record files.
fixed length
- *easy to predict file size*
- *easy to locate a record*
- *calculate a record's position as an offset*
- *n multiplied by record length*

4 points, 1 mark each, max 4 marks

v) State one disadvantage of storing data in fixed length files.   **1**
- *wastes space*
- *may require specialised software to locate record*

Any 1 point, 1 mark max

B) **i)**   State the type of file that can be searched using a binary search (binary chop).   **1**
- *sequential file*

1 mark

ii) Describe the steps taken in finding a record by means of a binary search.   **4**
- *file(s) must be in order*
- *go to middle record*
- *if found then report found*
- *if middle record is less than required value, binary search left half*
- *else binary search right half*
- *repeat until found or segment size =1*

Any 4 points, 1 mark each, max 4 marks

Total 20 Marks

QUESTION 23   **Marks**

A) **i)** State THREE (3) services that a business might access from its PSTN.   **3**
- *voice communication*
- *digital data communication*
- *fax*

1 mark each point, max 3 marks

ii) A network can be viewed from a variety of viewpoints. One of these is known as the network   **4**
viewpoint. State FOUR (4) tasks involving the network viewpoint in the transmission of data.
- *getting the information from the source to the destination*
- *determining the network topology*
- *determining what nodes there are*
- *determining how the nodes are interconnected*
- *determines the path taken by the data*

Any 4 points, 1 mark each, max 4 marks

iii) Explain what the OSI model is.   **4**
- *open systems interconnection*
- *a common basis for coordinating standards of interconnections in networks*
- *defines a layered architecture*
- *ordered set of sub-systems*
- *each layer communicates only with adjacent layers*
- *communication with other systems is via lower layers*

Any 4 points, 1 mark each, max 4 marks

iv) State the THREE (3) phases that occur in *connection mode* data communication.   **3**
- *connection establishment*
- *data transfer*
- *connection release*

3 points, 1 mark each, max 3 marks

v) State THREE (3) functions of the session layer in the OSI model.   **3**
- *support coordination between two entities*
- *support orderly data exchange between entities*
- *(mention of) presentation entities*
- *support orderly release of the connection*

Any 3 points, 1 mark each, max 3 marks

B) **i)** State THREE (3) items that would normally be included in a data packet.   **3**
- *source address*
- *destination address*
- *packet number*
- *checksum*
- *data*

Any 3 points, 1 mark each, max 3 marks

Total 20 Marks

QUESTION 24

Marks

Throughout the question, please credit any valid alternative point.

A) **i)** State THREE (3) primary objectives of the software design process. **3**
- *produce various models*
- *evaluate models against each other*
- *evaluate models against business requirements*
- *examine alternatives / trade-offs*
- *plan development activities*

Any 3 points, 1 mark each, max 3 marks

    ii) State FOUR (4) reasons why software may require maintenance. **4**
examples
- *correct errors*
- *correct design flaws*
- *improve design*
- *make enhancements*
- *interface with other systems*
- *convert for use on other hardware*
- *migrate legacy systems*
- *retire systems*
- *new requirements*
- *legislation*

Any 4 points, 1 mark each, max 4 marks

    iii) State FOUR (4) reasons why software developers might make use of a methodology such as SSADM. **4**
- *improve project management and control*
- *make more effective use of the strengths of staff*
- *develop better quality systems*
- *protect projects from loss of staff*
- *enable projects to be supported by computer based development tools*
- *establish framework for communication in a project*

Any 4 points, 1 mark each, max 4 marks

B) **i)** Describe what a database management system is. **3**
- *software*
- *to create databases*
- *to maintain databases*

3 points, max 1 mark each, max 3 marks

    ii) Explain how the adoption of a database management system brings technical advantages to a data processing operation. **4**
- *separates data from applications*
- *allows either to be changed independently of the other*
- *data can be managed in a uniform way*
- *makes effective use of skills because of consistency*
- *new systems will be more likely to integrate with existing ones*
- *tools provided to manage data in novel ways*
- *provides a foundation for a business-wide data management strategy*

Any 4 points, 1 mark each, max 4 marks

iii) State TWO (2) rules that apply to data stored in a relational database table. **2**
- *every row in the table must be in the same format*
- *every row in the table must be of the same data type*
- *some combination of columns must make every row unique*
- *mention of primary key*
- *can make no assumption about order of rows*

Any 2 points, 1 mark each, max 2 marks

Total 20 Marks