

NCC EDUCATION

INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES

COMPUTER TECHNOLOGY

25th NOVEMBER 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 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.

Marks

1

QUESTION 1

Which of the following is carried out by a transaction processing system?

- A) payroll processing
- B) making a withdrawal from an ATM
- C) compiling of a program
- D) calculating a set of electricity bills

Answer B

QUESTION 2

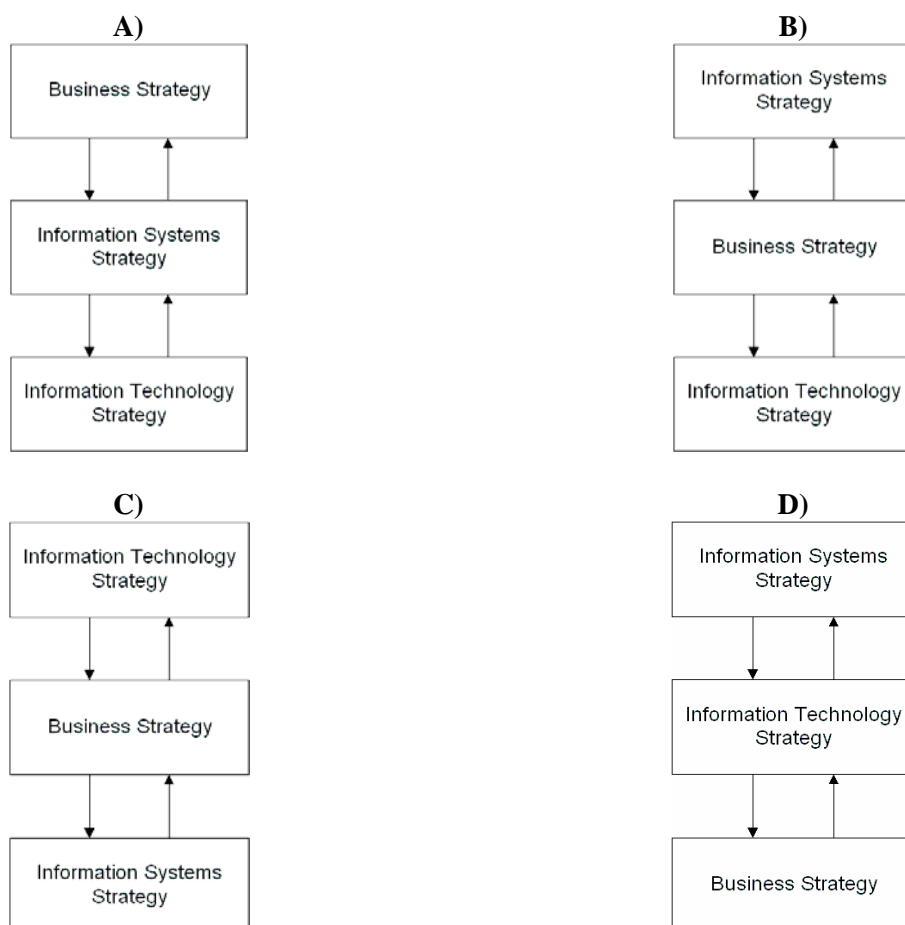
A business assembles components into electrical devices which it then sells to the public. The assembly process is an example of which primary business activity?

- A) inbound logistics
- B) service
- C) operations
- D) marketing and sales

Answer C

QUESTION 3

In the following diagram, each layer depends on the layer below it. Which diagram correctly shows the relationship between a company's IT, IS and business strategies?



Answer A

1

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SECTION A – 2

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

QUESTION 11

3

Which THREE of the following make use of control systems?

- A) payroll production
- B) engine management
- C) stock control
- D) microwave oven control
- E) burglar alarm
- F) hotel booking

Answer b), d), e)

3 points, 1 mark each

QUESTION 12

3

Which THREE of the following are input devices?

- A) ROM
- B) touch pad
- C) sensor
- D) microphone
- E) printer
- F) loudspeaker

Answer b), c), d)

3 points, 1 mark each

QUESTION 13

3

Which THREE items of information are concerned with internal company performance?

- A) sales
- B) budgets
- C) production
- D) cash flow
- E) economic trends
- F) technological developments

Answer a), c), d)

1 mark each max 3

QUESTION 14

3

Which THREE of the following are examples of systems software?

- A) compiler
- B) database management system
- C) linker
- D) interpreter
- E) spreadsheet
- F) media player

Answer a), c), d)

1 mark each max 3

QUESTION 15

Convert the hexadecimal number 54 into:

- A) an 8 bit unsigned binary integer
- B) a denary (decimal) number
- C) octal

Answer a) 01010100

b) 84

c) 124

1 mark each, max 3

QUESTION 16

Which THREE of the following are carried out by the session layer in an OSI based communication system?

- A) coordinates two presentation entities
- B) provides the means of access to a network for an application
- C) supports orderly data exchange
- D) optimises usage of network resources
- E) releases the connection when data exchange is completed
- F) provides physical connections

Answer a), c), e)

1 mark each, max 3

QUESTION 17

Which THREE of the following are valid IP addresses?

- A) 0.0.0.0
- B) 0.367.289.123
- C) 23.67.88.77.56
- D) 1.235.145.211
- E) 14.15.16.17
- F) 13.100.15

Answer a), d), e)

1 mark each max 3

QUESTION 18

Which THREE of the following are likely to be included in a data packet?

- A) the date sent
- B) the route to be taken
- C) the packet number
- D) the destination address
- E) a checksum
- F) a check digit

Answer c), d), e)

1 mark each max 3

QUESTION 19

Which THREE of the following are possible domain names?

- A) nccedu.com
- B) fred@nccedu.com
- C) <http://www.ncc.co.uk/>
- D) bbc.co.uk
- E) IANA.sk
- F) <http://www.spiegel.de/international/>

Answer a), d), e)

1 mark each max 3

Marks

3

QUESTION 20

Which THREE of the following involve lossy compression techniques?

- A) MPEG
- B) MP3
- C) ZIP
- D) JPEG
- E) MIDI
- F) GIF

Answer *a), b), d)*

1 mark each max 3

Total 30 Marks

SECTION B
ANSWER ANY THREE QUESTIONS

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

- a) i) Explain what is meant by EDI (Electronic Data Exchange). 2
- *the exchange of information between business / trading partners*
 - *the data is structured*
 - *paperless*
- 1 mark each, max 2*
- ii) Explain THREE ways in which EDI can improve a company's trading efficiency. 6
- Example answers – award others if appropriate*
- advantage*
- *faster trading cycle*
- reason*
- *because no delays (e.g. postal)*
- advantage*
- *shorter delivery times*
- reason*
- *goods not waiting for paperwork*
- advantage*
- *costs reduced*
- reason*
- *less paperwork*
- advantage*
- *fewer errors*
- reason*
- *validation built in / less need for checking / no re-keying of information*
- any 3 advantages, 1 mark each, max 3*
- any 3 correct reasons, 1 mark each, max 3*
- b) i) Explain what is meant by the term *Expert System*. 3
- *computer system*
 - *emulates a human expert*
 - *contains knowledge*
 - *contains inference engine*
 - *has a suitable interface*
 - *works by having dialogue with user*
 - *used for problem solving*
- any 3 points, 1 mark each, max 3*
- ii) Explain why the widespread use of word processing has led to the decline in the number of typists employed by organisations. 3
- *word processors make it easy for anyone to type*
 - *templates etc mean good documents can be produced with no special typing skills*
 - *users not afraid of making mistakes*
 - *standard letters can be produced automatically*
- any 3 points, 1 mark each, max 3*

c) i) State THREE facilities commonly provided by a voice mail system.

- *many phones can be answered at the same time*
- *messages can be stored*
- *personalised mailboxes*
- *menus*
- *messages sent to multiple recipients*
- *recorded messages*
- *forwarding messages*
- *notify calls received via pagers etc*
- *transfer callers*
- *different messages to different callers*
- *queuing*
- *call logging*

any 3 points, 1 mark each, max 3

ii) State THREE advantages for a business of using voice mail systems.

- *reduces costs / staffing*
- *less likely to miss a call*
- *can answer callers quickly*
- *can collect information about callers*
- *can quickly route callers to correct department*

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 TWO actions that can be carried out by the ALU of a computer. 2
- *arithmetic / calculations*
 - *comparisons*
- 2 points, 1 mark each*
- ii) Explain what a *register* is. 3
- *storage location*
 - *in processor*
 - *bigger than a RAM location*
 - *can carry out operations on data*
- any 3 points, 1 mark each, max 3*
- b) i) Explain the function of the system bus in a computer system. 4
- *a system for connection of components*
 - *connects main memory*
 - *connects processor*
 - *connects i/o controllers*
 - *made up of many lines*
 - *each line can carry 1 bit at a time*
- Any 4 points, 1 mark each, max 4.*
- ii) Identify THREE actions that can be carried out via 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 grant*
 - *clock*
 - *reset*
- any 3 points, 1 mark each, max 3*
- iii) Explain what is meant by *bus width*. 1
- *the number of lines in a bus*
- 1 mark*
- iv) Explain how the width of the data bus can affect the overall speed of a computer. 2
- *the more lines, the more data that can be carried in one cycle*
 - *this reduces the number of times that the processor needs to access the main memory*
- 2 points, 1 mark each, max 2*
- c) i) State what is meant by an *interrupt*. 2
- *a signal*
 - *to the processor*
 - *to suspend current process*
- any 2 points, 1 mark each, max 2*

- ii) Identify THREE situations that lead to the generation of an interrupt.

Examples: reward other correct answers

- *hardware failure*
- *any programmed event (such as overflow)*
- *timer – (to allow timed operation to occur)*
- *i/o – (to indicate completion of i/o operation or indicate error)*
- *user action – (e.g. press ESC)*

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) Describe the differences between *formal* and *informal* information. 4

Formal

- *can be handled by machine*
- *flows vertically in organisation*
- *standardised*
- *structured*
- *inflexible*
- *belongs to management*

any 2 points, 1 mark each, max 2

Informal

- *personal*
- *not standardised / reflects subjective judgements*
- *communicated ad hoc / flexible*
- *cannot be communicated in mechanical way*
- *grows out of dealings with individuals*
- *belongs to individuals*

any 2 points, 1 mark each, max 2

- ii) Explain why it is important for an organisation to know the difference between what is formal and what is informal information. 4

- *must not attempt to mechanise informal information*
- *can't be done*
- *people will reject informal information communicated in mechanised way*
- *people will invent new informal methods*
- *(only) formal information can be automated*

any 4 points, 1 mark each, max 4

- iii) Explain the difference between a system that has an *immediate response* performance and one that has a *conversational* performance. 2

- *immediate is very fast response*
- *conversational is slower*
- *conversational is at human speed*

1 mark each point, max 2

- iv) State ONE example of a situation where an immediate response is required and ONE where a conversational response is required. 2

Example:

Immediate:

- *any situation where there is a mechanised response such as control situation – autopilot etc*

Conversational

- *any transactional system where user is waiting e.g. ATM, e-commerce web site*

1 mark each, max 2

- b) i) Explain what is meant by a *sequential file*. 2

- *records stored one after another*
- *in order*
- *usually ordered on key field*

any 2 points, 1 mark each, max 2

ii) Explain how a binary search can be used to find a particular record in a sequential file.

- *get key*
- *look at middle record*
- *compare with key*
- *if found, output found message*
- *else if key > mid record*
- *repeat in right half of file*
- *if key < mid record*
- *repeat in left half of file*
- *until found*
- *or no more chops possible*

any 6 correct points, 1 mark each max 6

Total 20 Marks

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

- a) i) Explain the difference between *connection-mode* and *connectionless-mode* in the transmission of data. **4**
- connection-mode*
- *a dedicated link is opened between the communicating entities*
 - *link remains open while data being transmitted*
 - *link closed when transfer complete*
- connectionless-mode*
- *data is divided into units / packets*
 - *no connection is established*
 - *data may follow one of a variety of pathways*
 - *different data items may follow different routes*
- 1 mark each, max 4*
- ii) State ONE situation where connection-mode data transmission is a suitable method. **1**
- Examples (reward other answers if reasonable)*
- *direct use of a remote terminal*
 - *file transfer*
 - *analogue telephone call*
- any 1 point, max 1*
- iii) State ONE situation where connectionless-mode data transmission is a suitable method. **1**
- Examples (reward other answers if reasonable)*
- *email*
 - *web browsing*
- any 1 point, max 1*
- b) i) Explain the difference between a *program* and a *process*. **2**
- *a program is a stored set of instructions*
 - *a process is a program in execution*
- 2 points, 1 mark each, max 2*
- ii) A process can be in one of three states. Identify AND describe these states. **6**
- *running*
 - *running = actually using the processor*
 - *runnable*
 - *runnable = able to run but temporarily stopped*
 - *suspended*
 - *suspended = unable to run until some event occurs*
- 6 points, 1 mark each, max 6*
- iii) Describe what is meant by *process scheduling*. **2**
- *sharing processor time*
 - *choosing next process*
 - *according to a policy*
- Any 2 points, 1 mark each. max 2*

iv) State FOUR objectives of a scheduler.

- *maximise system throughput*
- *be fair to all users*
- *give rapid response to interactive users*
- *provide acceptable response time*
- *provide acceptable turn around time for batch users*
- *degrade performance gracefully*
- *ensure hardware resources are kept busy*

Any 4 points, 1 mark each. max 4

Total 20 Marks