5.9 COMPUTER STUDIES (451)

5.9.1 Computer Studies Paper 1 (451/1)

1. - To direct the operations of the internal processor components.
   - To control the flow of programs and data in and out of main memory.
   - To read and interpret program instructions.
   - To control flow of information to and from all the components of the computer.
   - To control flow of information/data
   - To determine next instruction to be executed first.
   - To fetch instructions from devices.
   - To direct/give/monitor operations of internal processing.
   - To send control signals to peripherals.

   (any 2 x 1 = 2 marks)

2. (a)
   - **Hardware portability** refers to the ease of moving hardware from one location to another √1 while
   - **Software portability** refers to the ability of running software on different platforms/models/ hardware/computers. √1

   (2 marks)

   (b) **Disadvantages of CD ROM over magnetic disks**

   - Fairly fragile - easy to break or scratch than magnetic disks.
   - Smaller storage capacity than a hard disk.
   - CD ROM have a slower data access time compared to magnetic disks.
   - Takes time to save/write data than magnetic disk.
   - CD ROM not re-writable. (2 □ 1 = 2 marks)

3. - To minimise/control spread of viruses.
   - To control access to data/programs.
   - To control movement of data.
   - To control unauthorized access to data/information.

   (2 marks)

4. (a) Any equipment/device that passes on a network signal. (1 mark)

   (b) Modem, Bridges, Gateway, Repeaters, Brouters, Routers, Cables, NIC, hubs/Switches, codec, computer, multiplexer/demltiplexer, Nanostations, phone.

   (First 6 x ½ = 3 marks)

5. Units

   (a) clock speed - hertz, gigahertz, megahertz
   (b) RAM size - bytes
   (c) HD size - bytes/bits
   (d) Monitor size - inches or ”

   (½ x 4 = 2 marks)

6. - Drawings/shapes/dimensions/symbols/callouts √1
   - Templates/clip art √1

- Photographs/pictures/scanned images/digital images √1
- Charts √1
- Graphics text/word art √1

(any 3 @ 1 mark each = 3 marks)

7. - Should have kept a back-up.
   - Store the diskette safely e.g. in a disk bank.
   - Use more reliable storage media.
   - Regular scanning.
   - Avoid ejecting disk while in use.

8. - **Relative referencing**, there is use of a formula whose references keeps on changing automatically depending on their relative position when they are copied from one cell to another.
   - In **Absolute referencing,** the cells referenced are specific.

(2 marks)

9. (a) Facilitates mail creation.
Facilitates reading mails.
Facilitates sending mails
Maintain a mailing list
Keeping track of number of emails.
Editing and composing mails.
Advertising
Creating email accounts/social networking list.
Maintain contacts/address list.
Deleting mails.

(any 2@ ½ mark each)

(b) SMTP, IMAP, POP3, MIME, HTTP

(any 2@ ½ mark each)

10. (a) **Superscript** - A character printed slightly above the normal line/text usually in smaller type.

(1 mark)

(b) Splitting/divinding a document in order to apply different styles to each section.

(1 mark)

11. (a) An association between two tables in which the primary key value of each record in the primary table corresponds to the value in the matching field or fields of one and only one record in the related table.

(2 marks)

(b) An association between the tables in which the primary key value of each record in the primary table corresponds in the value matching field or fields of many records in the related table.

(2 marks)

12. (a) Preliminary investigation/requirements specifications/feasibility √1
(b) Requirement analysis/fact finding/data gathering/information gathering and maintenance √1
(c) Implementation stage and maintenance √1

(1 mark x 3 = 3 marks)

13. A: **Selection tool** - used for selecting/choosing/highlighting objects on the work area. √1
(1 mark)

B: **Text tool** - used for enabling typing/editing or insertion of text. √1
(1 mark)

C: **Cropping tool** - used for trimming graphics. √1
(1 mark)

14. - Coding/writing/constructing (building) the system.
- Turning system specification into an information system.
- Modify existing programs to meet changes in information processing needs (maintenance)
- Implementing/installing a system
- Testing a new system
- Developing system/program
- Documenting/giving technical guide (first 2 x 1 = 2 marks)

15. (a) The process of rewriting parts of a file to contiguous sectors on a disk.
(1 mark)

(b) **Purpose** - to increase the speed of access and retrieval of files.
- to increase space on the disk space
(1 mark)

16. (a) (i) An entry from, or an exit to another part of the program flowchart that is within the same page.
It is an on page connector.
(1 mark)

(ii) A connector used instead of the connector symbol to designate entry to or exit from a page.
It is an off page connector (1 mark)

(iii) The beginning and/or end in a program. (1 mark)
To start and/or stop/terminate in a program.

(b) (i) P = 5
Q = 6
N = 7

IF N ≥ 10 THEN

ELSE

R = P + Q = 5 + 6 = 11

S = Q = 6

T = R + S = 11 + 6 = 17

R	S	T
11	6	17

(Working 1½ @½ mark each)
(Answer 1½ @½ mark each)

(ii) P = 5

Q = 6
N = 10

R = P * Q = 5 + 6 = 30

S = Q - P = 6 - 5 = 1

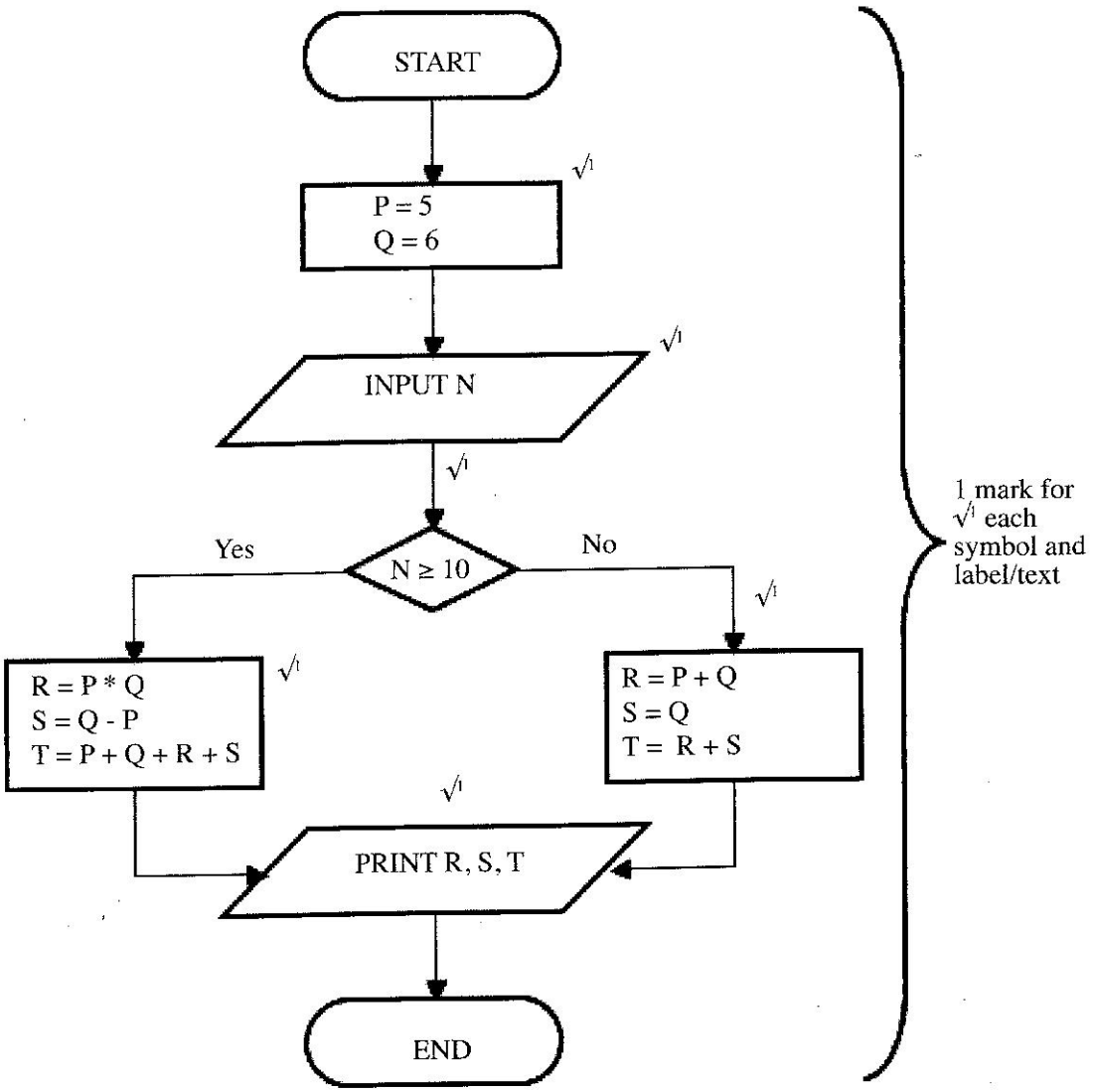
T = P + Q + R + S = 5 + 6 + 30 + 1 = 42

R	S	T
30	1	42

(3 marks)

(Working 1½ @½ mark each)
(Answer 1½ @½ mark each)

(c)



17. (a) (i)

$$00\overset{5}{1}0\overset{3}{1}\overset{2}{1}0\overset{0}{1}$$

$1 \times 2^5 = 32$ ½

$1 \times 2^3 = 8$ ½

$1 \times 2^2 = 4$ } ½

$1 \times 2^0 = 1$ } ½

45_{10}

(ii)

$$1\overset{6}{1}00\overset{3}{1}00\overset{0}{1}$$

↑

sign bit

$1 \times 2^6 = 64$ ½

$1 \times 2^3 = 8$ ½

$1 \times 2^0 = 1$ ½

-73_{10} ½

Mark correct for those who use the two's or one's complement correctly.

17.

(b)

0.42 x 2	=	0.84	}	√1 mark
0.84 x 2	=	1.68		
0.68 x 2	=	1.36	}	√1 mark
0.36 x 2	=	0.72		
0.72 x 2	=	1.44	}	
0.44 x 2	=	0.88		√1 mark
	=	0.011010		√1 mark

(c) 11_{10} = 1011_2 (1 mark)

8 = 1000_2 (1 mark)

Two's complement of 11_{10} = 0101 (1 mark)

```
  0101
+ 1000
  1101
```

(2 marks)

(d)

```
  11001
+  1101
 100110
-   101
 100001₂
```

(2 marks)

18. (a)
- Audit trail
- Use of antimalware software
- Data encryption
- Log files
- Firewall
- Intruder detection
- User access levels
- Password/Biometrics

(any 3 x 1 = 3 marks)

(b) (i)
- High speed communication
- Reduce data transfer charges
- Provides a secured network
- Allow remote access
- Media cannot be vandalised easily

(any 2 x 1 = 2 marks)

(ii)
- No cumbersome cabling needed between sites.
- Support multi-channel transmissions.
- Wireless supports un-directed signals therefore allowing many recipients.
- Do not require access rights on the land between the buildings.

(first 3 x 1 = 3 marks)

(iii)
- Line of sight requirement.
- Expensive towers required/high initial cost.
- Subject to interference such as passing radio waves and weather conditions.
- Very difficult to restrict access if it is un-directed.
- Hard to secure
- Easy to hack (first 2 x 1 = 2 marks)

(iv)
- Satellite
- Microwave
- Radio waves/blue-tooth/infrared (first 2 x 1 = 2 marks)

(c)
- Firewalls
- Antivirus
- Policy formulation on the usage of internet/password/security
- Using email instead of storage devices to transfer document files.
- Use genuine/authentic/unpirated software

(first 2 x 1 = 2 marks)

19. (a) (i) **Information system** is an arrangement of people, data, processes, communication and IT that interact to support problem solving.

(ii)
- Improve day-to-day operation
- Support problem solving
- Support decision making needs for management
- Data capture
- Processing data into information
- Data security
- Storing of data/information

(any 2 for 2 marks)

(b) (i) Stored and retrieved according to their disk address which is generated by use of an algorithm or formula i.e. stored randomly, accessed randomly.

(2 marks)

(ii) Method of storing or retrieving information that requires the program to start reading at the beginning and continue until it finds the desired data.

(2 marks)

(c) (i) File B.

(ii) Transaction file: It contains data which is regularly added.
Has data/fee payment

(iii) Master File: It contains records that do not change regularly like in file A.

(½ x 2 for name, 1 mark x 2 = reasons = 3 marks)

(d) (i) Real time processing. (1 mark)

(ii) **Advantages**

- Information is readily available for instant, decision making.
- Updating is done instantly when transaction occurs.
- Auditing is easier.
- It is accurate
- Prevent double booking

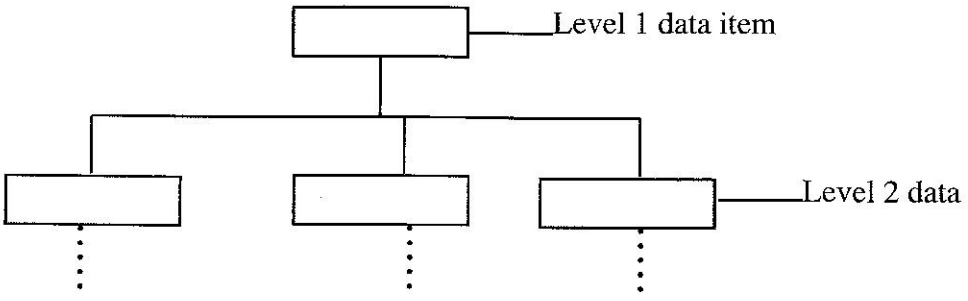
(any 2 x 1 = 2 marks)

Disadvantages

- Complex - difficult to configure/set up.
- Expensive to acquire and maintain.
- Errors that occur are difficult to correct

(any 2 x 1 = 2 marks)

20. (a)



(level 1)
(level 2)
(2 marks)

- Data items are arranged in a tree like format.
- Access is through a single path and all from one single item called the root component.

(1 mark x 2 = 2 marks)

(b) **Factors**

- Complexity of data/user needs/user friendliness
- Security and integrity
- Complexity of DBMS
- Volume of data/size
- Software compatibility with existing DBMS
- Cost of the data base

(any 3 x 1 = 3 marks)

Reasons

- Complexity of data - Complex data requires complex DBMS.
- Security and integrity - Data which is intended to be secured in terms of access, can be handled by complex DBMS which provides for such requirements.
- Complexity of DBMS - Complex DBMS do require complex skills, hence more training. It is therefore costly to run/use such system.
- Volume of data - Voluminous data require to be ran on stable application. They also take up extra computer system resources.
- Software compatibility - enables pre-existing databases to be exported to the new one.

(corresponding explanation x 3 = 3 marks)

(c) (i)
- Field type/data type
- Field size
- Format
- Reasonableness
- Range constraint
- Presence check

(any 3 x 1 = 3 marks)

(ii) Any **index key** is a database feature used to speed up search and sort operations in a table;
whereas
a **primary key** is a field that enforces uniqueness in a table so that one record is not entered twice
or
a **primary key** is a field that uniquely identifies each record.

(1 mark □2 = 2 marks)