

MERU CENTRAL CLUSTER EXAMS

END OF TERM TWO – 2020

451/1 computer studies

Paper 1 (theory)

2 ½ hours

End Term Two Exam

November 2020

FORM FOUR

MARKING SCHEME

SECTION A

(40 Marks)

Answer all the questions in this section

1. (a) Explain disk formatting (2mks)
 - ◆ Process of preparing a new disk for use by imprinting empty tracks & sectors on the surface of the disk that can be recognized and access by a particular operating system
 - ◆ The preparation/ initialization of a disk for storage of data
2. (a) Explain why the following controls should be implemented for computer based system(2mks)
 - (i) Back- ups - Backups can be used to recover/ restore/ prevent lost data
 - (ii) Password- Passwords control access to computer systems/ facilities
- (b) List two examples of utility software in operating systems (2mks)
 - Text editors
 - Sort utility
 - Language translators
 - Merge utility
 - Loader
 - Copy utility

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- Linker
- Dump utility
- Diagnostic tools
- Database management system

3. Differentiate between source program and object program (4mks)

Source code is the program as written by the programmer using an editor program either in high level or assembly language.

Object code is the program in machine code (or binary form) produced by a compiler or assembler after translating the source program, and can be readily and can be readily loaded into the computer.

4. The cells P3 to P20 of a worksheet contain remarks on students ' performance such as very good, good, fair and fail depending on the average mark. Write a formula that can be used to count ALL students who have the remark "very good". (3 mks)

=COUNTIF (p3:p20,"Verry Good")

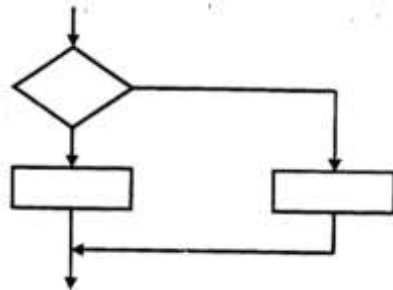
5. (a) State the purpose of registers in a computer system (1 mks)

They act as high speed storage locations. They are used to hold data and instructions temporarily just before and after processing.

6. Give Three advantages of using GUI based operating system over a command line interface (3mks)

- User friendliness
- Easy to learn & use even by those who do not have much knowledge about them
- One does not need to master any commands
- It is faster to work with than a command line interface as it only relies on clicking the icons by use of a pointing device

7. (a) Name the control structure depicted by the flowchart below (1 mk)



Selection control structure e.g., If-then-else

- (b) Explain the following terms as used in program implementation (2 mks)

- (i) parallel running

This is where both the existing and the new systems are run concurrently/simultaneously (at the same time) for a period of time until users have gained confidence in the new system. Data is processed on both systems in order to compare their performance, and also cross check the results.

- ii) Direct change over

This is a complete replacement of the existing system with the new system in one bold move. The existing system is stopped & abandoned and the new system starts operating immediately.

8. (a) Name two methods of representing signed numbers in computers (2 mks)

- Ones compliment
- Twos compliment
- Prefixing an extra sign bit

- b) Identify the four types of storage media shown below (2marks)

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- i) Floppy disk
- ii) Zip disk
- iii) Magnetic tape
- iv) Compact disk / digital versatile disk
- c) Compare the storage device (i) and (iii) above (1mark)
 - Floppy disk is fast in accessing data than the magnetic tape
 - Floppy stores data randomly while a tape store sequentially
 - Floppy has a smaller capacity than magnetic tape

9. Differentiate between **Random** and **indexed-sequential** file organization methods (2mks)

In *random file organization*, records are stored in the file randomly and accessed directly, while in *indexed –sequential*, the records are stored sequentially but accessed directly using an index.

10. Name two types of relationships that can be applied in database design. (2mks)

- One to one
- One to many/ Many to One
- Many to Many

11. Explain the following terms as used in word processing: (3 mks)

- a) Indenting

It is moving of line/paragraph text away from the left or right margin

Leaving a space at the beginning of a line/paragraph of text from the margin

- b) Alignment

Refers to how text is positioned/lined up in a paragraph relative to the left, right or centre of the page.

c) Word wrap

A facility that word processor use to automatically move the text cursor to the beginning of the next line when it reaches the right margin automatic rolling of text to the next line when you reach the end of the line.

12. Outline two ways in which computers can be used in hotels. (2mks)

- Reservation/booking of rooms
- Record keeping on sales and purchases (stock control)
- Producing bills & payrolls
- Marketing and advertising
- Communication
- Security

13. a) Explain binary coded decimal code of data representation. (1mk)

This is a data encoding system that uses 4 binary digits to represent an individual decimal digit.

b) firewall A software that filters requests of data from a remote location.

14. Arrange the following data units in ascending order of size.

BYTE, FILE, BIT, NIBBLE (2mks)

Bit → Nibble → Byte → File

15. State two health issues that may result from prolonged use of computers. (2mks)

- Harmful radiations that cause damage to eyesight/eye problems
- eyestrain/eye fatigue
- Headaches
- Repetitive Strain Injury (RSI) i.e. arm strain, wrist strain
- finger deformation
- Back strain.

SECTION B (60 MKS)

16. a) State the stage of program development in which: (2mks)

i) A flowchart would be drawn

Program design

ii) The programmer would check whether the program does as required program

Testing

iii) The user guide would be written

Program testing

iv) The user guide would be written

Program documentation

b) Translate the following flowchart into a pseudo code (7marks)

```
Start
Sum = 0
Count = 0
While scores are present do
Read score
Count = count +1
Sum = sum +score
If there are more scores then
Average = sum/count
Print average
End if
Else
Print no record exist
End while
Stop
```

c) Assuming the following score are entered 0, 20 and 40 respectively what would be output from the flowchart (3marks)

Score	0	20	40
Sum	0	20	60
Count	1	2	3
Average	0	10	20

17. 17. a) Convert each of the following binary numbers to decimal equivalent given that the left most digit is a sign bit (4marks)

i) 00101101_2
 0101101_2
 $= (1 \times 2^5) + (1 \times 2^3) + (1 \times 2^2) + 1 \times 2^0$
 $= 32 + 8 + 4 + 1$
 $= 45_{10} \quad +45_{10}$

ii) 11001001_2
 1001001_2
 $= (1 \times 2^6) + (1 \times 2^3) + (1 \times 2^0)$
 $= 64 + 8 + 1$
 $= 73_{10} \quad -73_{10}$

b) Convert the decimal number 0.42 to 6 bit binary notation (4marks)

$0.42 \times 2 = 0.84$
 $0.84 \times 2 = 1.68$
 $0.68 \times 2 = 1.36$
 $0.36 \times 2 = 0.72$
 $0.72 \times 2 = 1.44$
 $0.44 \times 2 = 0.88$
 $= 0.011010_2$

c) Using two's complement, subtract 11_{10} from 8_{10} , leaving your answer in binary notation (3marks)

$8_{10} - 11_{10}$
 $8 \quad 00001000_2 \quad 00001000$
 $11 \quad 00001011_2 \quad 11110101$
 $11110100_2 \quad 11111101_2$
 $+ 1$
 11110101

d) Perform the following binary operation (2marks)

$11001_2 + 1101_2 + 101_2$
 101011_2

e) Using place value method, convert 45_{10} to its binary equivalent (2marks)

Place value	$2^6=64$	$2^5=32$	$2^4=16$	$2^3=8$	$2^2=4$	$2^1=2$	$2^0=1$
Difference	45-64	45-32	13-16	13-8	5-4	1-2	1-1
	-19	13	-3	5	1	-1	0
Digit	0	1	0	1	1	0	1

$= 01011101_2$

18. a) What is virtual reality (2marks)

- Is where a person gets psychologically immersed in an artificial environment generated by computer system

b) Explain the following interactive sensory equipment used in virtual reality (2marks)

i) Headgear

- Channels images and sound from the source to the eyes and ears of the wearer hence producing a 3 – D effect in the virtual world.

ii) Body suit

- Made of conductors wires that sense body movement and relay data into the virtual reality system
- c) **What is Artificial intelligence? (1mark)**
 - Making computers perform task that could otherwise require intelligence if performed by human beings.
- d) **State and explain three components of an expert system (6marks)**
 - Knowledge base:- store knowledge in the form of rules as facts concerning a certain subject interest
 - Inference engine – software which control how knowledge is searched and accessed from the knowledge base.
 - User interface:- enables the user to interact with the system
- e) **Explain method of information gathering in system development (3marks)**
 - Observation
 - Questionnaire
 - Record checking
 - Interview
- f) **List two application area of virtual reality (2marks)**
 - Flight test simulation
 - Space station maintenance
 - Micro-surgery where it enables a tiny surgical device inserted in patient's body to be controlled
 - Testing the design of building using computer simulation

19. a)

- i) **Other than select queries name two other queries used in databases (2marks)**
 - Make table query
 - Delete
 - Update table
 - Append
- ii) **Write an expression that will return only those patients who are 20 years' old (3marks)**
 Age: 2016 – (Date of birth)
 Condition = 20

- b) **Differentiate between bound and un bound controls as used in database forms (2marks)**

- Bound is linked to a table in the database and un bound is not

c) **Give two reasons why input screens are better data entry designs than entering data directly into a table (2marks)**

- Deals with one record at a time
- Computations can easily be done using command button

d) **The figure below is an extract of a worksheet containing information on household items. Use it to answer the following questions:**

	A	B	C	D	E	F
1	Item description	No of units	Cost per unit	Total cost		
2	Maize flour	20	210			
3	Tea leaves	64	185			
4	Sugar	77	149			
5	Salt	28	25			

- i) **Write a formula to calculate the total cost of sugar (1mark)**
 = (B4*C4) or PRODUCT (B4,C4)

ii) The prices of all items increased by 10% and the value 10% is placed in cell B8. Using cell addresses with absolute referencing only, write a formula to calculate the new unit of the salt. (2marks)

= (\$B\$8*C5)+C5

iii) Write a function to display the number of cells in which the cost per unit is equal to 25.(2marks)

= COUNTIF (C2:C5, = 25)

iv) Write a function to display the least total cost for all items (1mark)

= MIN (D2:D5)

20. A school computer laboratory is scheduled to undergo major renovations. The lab is schedule to receive new computer whose specifications are given below:-

Pentium IV 2.8GHz processor

40GB HDD

3½ FDD

256MB RAM

56 x CD ROM

17"SVGA TFT monitor

The computers are going to be networked and will be able to browse the internet.

a) Explain what is meant by the terms:- (2marks)

i) FDD - Floppy disk drive

ii) HDD - Hard disk drive

iii) SVGA - Super video graphic array

iv) TFT - Thin film transistor

b) The computer is to be networked, name one extra device that should be fitted on every computer to enable this to happen (1mark)

- Network interface card

c) The computer is to receive internet facilities through the server on a dial; up system. Name and describe the function of a special device that needs to be connected to the server to complete the connection.

(1mark)

- Modem

d) i) The school has to apply star topology to link up the computer. List two advantages of this type of topology (1mark)

- A breakdown of one of the breakdown does not affect the other nodes

- It's easy to configure

ii) Name the central device used to connect the computers in this topology (1mark)

Server

e) List two other types of topologies that the school could have opted for (1mark)

- Bus

- Ring

- Mesh

f) List four advantages of using a network (2marks)

- Sharing of resources

- Improved communication

- Distributed process

- Remote communication

- Telecommuting

- Reliability

- g) i) **Data transmission via the internet is done using a mode known as packet switching. Describe this data transmission mode (1mark)**
Is where a packet is send across with an address
- ii) **Name one other modes of transmission (1mark)**
Ethernet
- h) i) **The school's LAN is done using UTP cable. List two advantages of using this type of cable.**
- Cheap compared to fibre optic cable
 - Easy to configure
- ii) **List two advantages of using fibre cable in networking (1mark)**
- Faster in transmission
 - Higher bandwidth
 - Low attenuation
- i) **Data flows in the school's LAN in a duplex manner. Discuss two other types of data transmission in network giving examples (2marks)**
- Simplex
 - Half duplex