

REPUBLIQUE DU CAMEROUN
Paix – Travail – Patrie
MINISTRE DES ENSEIGNEMENTS SECONDAIR

DELEGATION REGIONALE DU LITTORAL

INSPECTION REGIONALE DE PEDAGOGIE



REPUBLIC OF CAMEROON
Peace – Work – Fatherland
MINISTRY OF SECONDARY EDUCATION

REGIONAL DELEGATION FOR LITTORAL

REGIONAL INSPECTORATE OF PEDAGOGY

LITTORAL COMPUTER SCIENCE TEACHERS ASSOCIATION (LICSTA)

GENERAL CERTIFICATE OF EDUCATION MOCK EXAMINATION		
ADVANCED LEVEL		
SUBJECT TITLE	795 – COMPUTER SCIENCE	MARCH 2023
PAPER NUMBER	2	

Time Allowed: Two and Half Hours (2H:30M)

INSTRUCTIONS TO CANDIDATES:

Answer any **SIX** Questions.

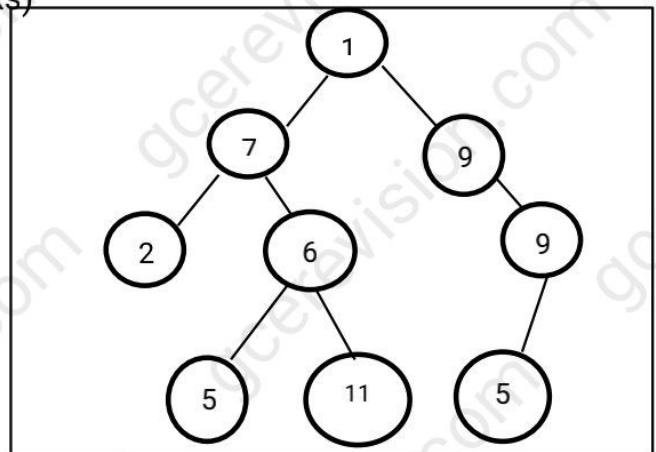
- All questions carry 17marks
- For your guidance, the approximate mark for each part of a question is indicated in brackets.
- You are reminded of the necessity for good English and orderly presentation in your answers
- In calculations, you are advised to show all the steps in your working, giving your answer at each stage.

Question 1

- i)
 - a) What is data structure? (2mks)
 - b) Explain the difference between static data structure and dynamic data structure. Give an example in each case (4mks)
 - c) Distinguish between data compression and data conversion (2mks)
- ii)
 - a) What is memory addressing? (2mks)
 - b) Distinguish between Direct and Indirect addressing (2mks)
- iii)
 - a) What is a binary half adder? Design a binary half adding logic circuit for bit A and B whose output is S (4mks)
 - b) Give the logic symbol for (**NOT A OR(A AND NOT B)**) (1mk)

Question 2

- i) Sam is a hacker. He is targeting to break into some ones bank account after picking his Debit Card. Sam knows that the PIN code of a card is made of 4 digits.
 - a) How many total trials must Sam make to guess the PIN successfully? (2mks)
 - b) In problem solving, which approach is Sam using to crack the PIN code. Explain further (2mks)
- ii) Consider the Tree given below
 - a) State 2 reasons why the tree is referred to as binary tree? (2mks)
 - b) What is the depth of the Tree? (2mks)
 - c) Traverse the tree using
 - Pre-order
 - Post-order
 - In order (2x3mks)
 - d) Briefly describe:
 - Global variable
 - Local variable
 - Constant variable (2x3mks)



Question 3

- i)
 - a) What is an algorithm? State any 3 properties of a good algorithm.(4mks)
 - b) With respect to algorithm, explain what it means by Deterministic algorithm and Correctness of algorithm (4mks)
 - c) Briefly describe the main function of the following network devices

- Router
- Switch
- NIC

- ii) With respect to software design, state the importance of the following
- a) Software Reuse
 - b) Prototyping
 - c) API

Question 4

- i) The table below indicates Nodes, data and address of each node. The Nodes are arranged in the order ABCD. Using an arrow () as a pointer, draw annotated diagrams of the following linked list

s/n	Nodes	Data	Address
1	C	500	C44
2	A	800	15A
3	D	250	40D
4	B	100	8BO

- a) A single Linked List
 - b) A circular Linked List
 - c) A doubly Linked List (2x3mks)
- ii)
- a) What is a process with respect to OS? (2mks)
 - b) Give the states a process undergoes to successful execute (5mks)
 - c) What is a computer network? Design a star topology for 4 computers and assign class C address to the 4 network devices. (4mks)

Question 5

- i)
- a) Distinguish between Pre-emptive and Non pre-emptive scheduling algorithms (2mks)
 - b) What is context-switching? Which scheduling method above requires context switching 2mks

c) A digital clock displays the time as shown below

ii)

08:20

Give the binary code that represents this time (ignore the colon)

- a) Distinguish between system software and application software (2mks)
- b) Explain the terms multi-processing and multi programming as used in OS. (4mks)
- c) Give one example each of a sharable and non-sharable resource in the computer (2mks)
- iii) a) In modular design two terms that describe relationship between components are coupling and cohesion. Explain the underlined terms. (2mks)

Question 6

i) Consider the subroutine to recursively find the factorial of n

```

1. Subroutine fact(n)
2. Begin
3.   IF (n==1 OR n==0) then
4.     return 1
5.   ELSE
6.     return n*fact(n-1)
7.   EndIf
8. Endsub

```

- a) Explain why the subroutine is said to be recursive? (2mks)
- b) State the Base case of the subroutine (2mks)
- c) Given that n=5, what is the output of this subroutine? Show all executing steps using the binary tree. (4mks)
- ii) a) What is a Bus? Describe the role of three system buses (4mks)
- b) List 3 differences between a file processing system and a database system (5mks)

Question 7

- i) a) Distinguish between convoy effect and starvation. Which scheduling algorithms may lead to convoy effect?

b) Consider the process shown below

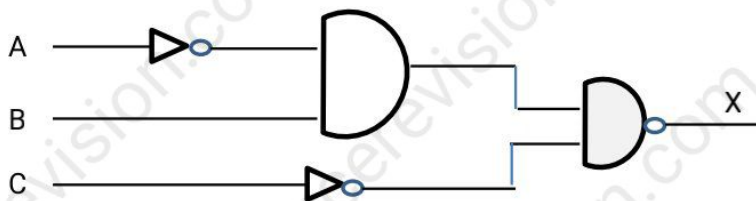
	Arrival Time	Priority	Burst Time
P1	0	2	1
P2	1	1	2
P3	0	1	3
P4	2	2	1

Using priority scheduling (with non-pre-emptive) draw the Gantt chart) (3mks)

ii) Explain the following system deployment methods

- Direct conversion
- Parallel conversion
- Phased conversion (2x3mks)

iii) For the logic circuit below, Give the output



Question 8

- What is a control structure? Distinguish between pre-test and posttest loops (4mks)
 - Describe the following OOP terms and state a situation where they are applicable
 - Inheritance
 - Polymorphism
 - Encapsulation (2x3mks)

ii) Consider the code fragment below

```

1. int eval[N]
2. For i = 0 to N-1 Do
3.   IF i mod 2 == 0 Do
4.     eval[i+1] ← i
5.   ENDIF
6. EndFor

```

- What are the types of control structures used in the code fragment? (2mks)
- Consider $N \leftarrow 8$, draw the structure of the array **eval[N]** and use the algorithm given

to fill elements of the array (3mks)

c) What are anomalies in database?

Explain insertion and Deletion anomaly (3mks)

END