

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATION
RESIT/SUPPLEMENTARY / SPECIAL EXAMINATIONS
EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR SCIENCE IN
COMPUTER SCIENCE**

COSC 222: COMPUTER OPERATION SYSTEM

STREAMS:

TIME: 2 HOURS

DAY/DATE: THURSDAY 04/11/2021

2.30 P.M - 4.30 P.M.

INSTRUCTIONS

- Answer question ONE and any other TWO questions
- Marks are awarded for clear and concise answers

SECTION A

QUESTION ONE COMPULSORY - (30 MARKS)

- (a) Using relevant example(s) define the term operating. **[2 marks]**
- (b) Briefly explain four functions in file, process and memory management performed by windows 7 operating system. **[8 marks]**
- (c) Distinguish between multi-user and multiprocessing operating systems. **[2 marks]**
- (d) Give two reasons why an operating system should require memory management. **[2 marks]**
- (e) Highlight any two levels of directory organization. **[2 marks]**
- (f) Give three reasons why an operating system should require memory management. **[3 marks]**
- (g) Context switching in Operating system is the switching of the CPU from one process to another.

- i) What are the three scenarios where context switches need to occur. **[3 marks]**
- ii) Describe the steps for a context switch. **[4 marks]**
- (h) Differentiate between pre-emptive and non-preemptive scheduling, as used in CPU scheduling. **[4 marks]**

SECTION B (40 MARKS) CHOOSE TWO QUESTIONS

QUESTION TWO (20 MARKS)

- (a) Explain the following terms as they are used in the scheduling criterion:
 - i) CPU utilization. **[8 marks]**
 - ii) Turnaround time. **[8 marks]**
 - iii) Waiting time. **[4 marks]**
 - iv) Response time.
- (b) Explain four services provided by an operating system.
- (c) Explain two major complications that concurrent processing adds to an operating system.

QUESTION THREE (20 MARKS)

The table below shows jobs submitted for execution in a computer system with Time-sharing Capability

Process	Arrival Time	Burst Time
p ₁	0	3
p ₂	1	5
p ₃	3	2
p ₄	9	5
P ₅	12	5

The Arrival Time and CPU burst are in arbitrary units. Using the table

- a) Construct Gantt Chart for FCFS,SJF,SRTN and RR (Time slice-3) scheduling algorithms and work out the average waiting time **[12 marks]**
- b) Which of the algorithms provide optimal values for the Average Waiting Time? **[1 mark]**
- c) Is the answer to (b) consistent with your expectation? Explain **[3 marks]**
- d) Explain the requirements for mutual exclusion **[4 marks]**

QUESTION FOUR (20 MARKS)

- (a) Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), place the following processes;- 212K, 417K, 112K, and 426K (in order) using:-

- i) first-fit
- ii) Best-fit
- iii) Worst-fit **[6 marks]**

From a) above advice on the algorithm that uses the memory effectively. **[1 mark]**

Explain the term thrashing and state its disadvantages **[3 marks]**

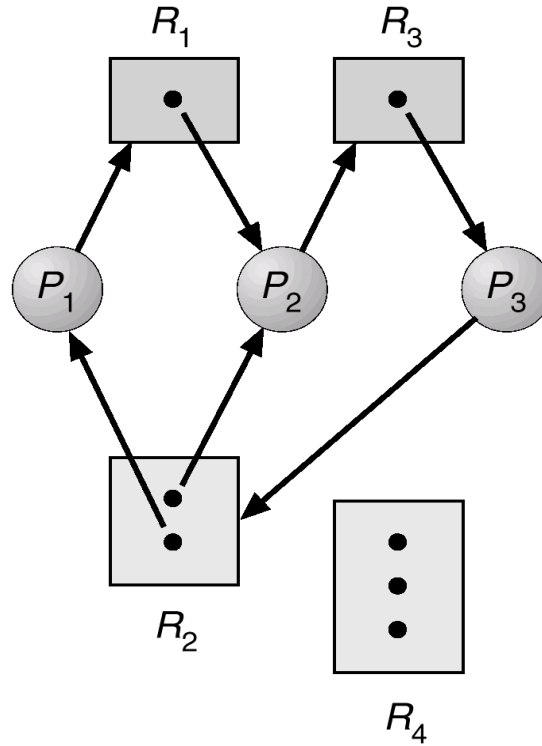
(b) Explain three algorithms used by memory manager to allocate a new created or swapped in process. **[6 marks]**

(c) Explain the following terms;

- i) Fetch policy
- ii) Replacement policy **[4 marks]**

QUESTION FIVE (20 MARKS)

- a) What is a deadlock? Discuss the main necessary conditions for a deadlock to occur **[5 marks]**
- b) Differentiate between multitasking and multiprogramming **[3 marks]**
- c) What is a scheduler? Explain types of schedulers citing exactly where each is best applicable. **[4 marks]**
- d) State four benefits of threads **[3 marks]**
- e) Consider the following resource allocation graph where R1,R2,R3,R4 are resources and P1,-----P3 are processes:



- i) Explain cycles of requests taking place above **[2 marks]**
- ii) Will deadlock occur and Why? **[3 marks]**