CHUKA  **UNIVERSITY**

SUPPLEMENTARY/ SPECIAL EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMPUTER SCIENCE

COSC 222: COMPUTER OPERATING SYSTEM

STREAMS: BSC (COMP SCIE) **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 03/02/2021 **2.30 PM – 4.30 PM**

INSTRUCTIONS:

1. Answer question **ONE** and any other **TWO** questions
2. Marks are awarded for clear and concise answers

SECTION A

QUESTION ONE COMPULSORY - (30 MARKS)

(a) Using relevant example(s) define the term operating. **[2marks]**

(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.
ii) Turnaround time.
iii) Waiting time.
iv) Response time. **[8 marks]**

(b) Explain four services provided by an operating system. **[8 marks]**

(c) Explain two major complications that concurrent processing adds to an operating system. **[4 marks]**

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
P5	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

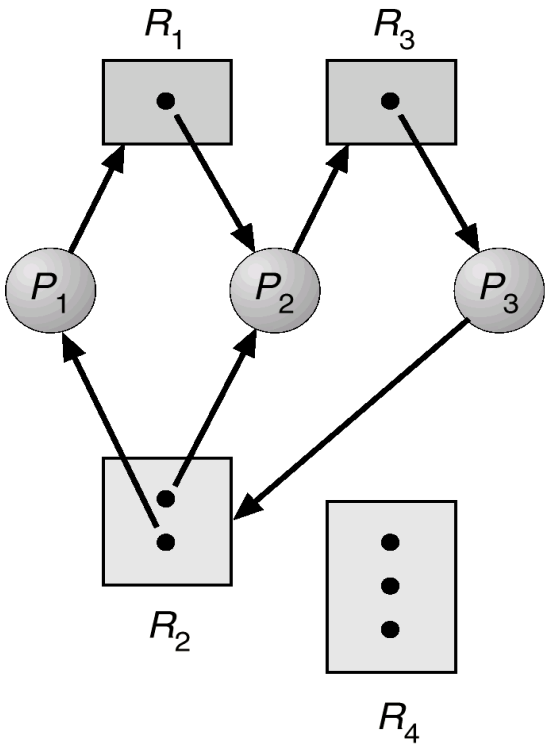
[5 marks]

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]**
