CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COSC 222: COMPUTER OPERATING SYSTEM

STREAMS: **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 6/12/2017 **11.30 A.M – 1.30 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. **[**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

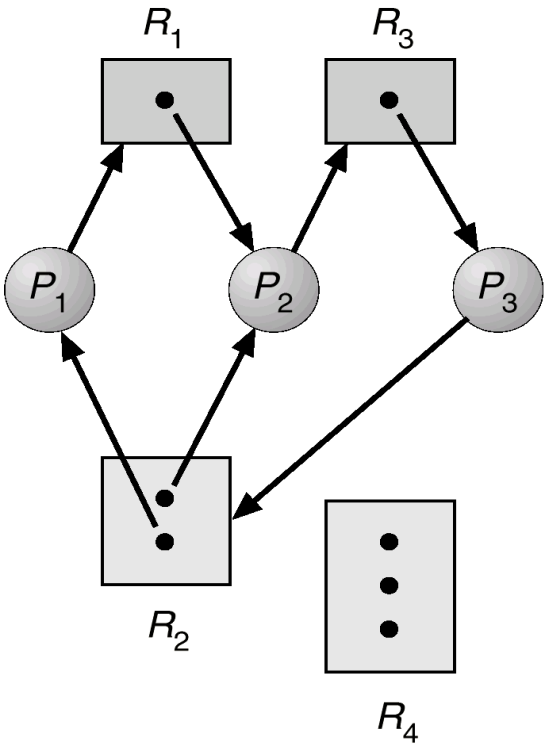
[5 marks]

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]
