JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION AND COMMUNICATION TECHNOLOGY

2ND YEAR 1ST SEMESTER 2016/2017 ACADEMIC YEAR

MAIN CAMPUS (REGULAR)

COURSE CODE: ICT 3224

COURSE TITLE: OPERATING SYSTEMS

EXAM VENUE: STREAM: (BSc. Information and Communication Technology)

DATE: APRIL 2017   EXAM SESSION:

TIME: 2.00 HOURS

<u>**Instructions:**</u>

1. **Answer Question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on the question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE [30 MARKS]

a) Explain in brief any FOUR , functions of an operating system   [8marks]

b) What are the differences between trap and interrupt   [4marks]

c) Explain different states of a process with the help of state diagram   [8marks]

d) Consider a system with a set of processes P_1 P_2 *and* P_3 and their CPU burst times, priorities and arrival times being mention as below:

Process	CPU burst time	Arrival time	Priority
P_1	5	0	2
P_2	15	1	3
P_3	10	2	1

Assuming 1 to be the highest priority, calculate the following: [10marks]

   i.   Average waiting time using FCFS, SJF (Preemptive and Non-preemptive) and priority (Preemptive and Non-preemptive) scheduling mechanism.

   ii.   Average turn around time using FCFS, SJF (Preemptive and Non-preemptive) and priority (Preemptive and Non-preemptive) scheduling mechanism.

   iii. Assume time quantum to be 2 units of time. Calculate average waiting time and average turn around time using Round-Robin scheduling.
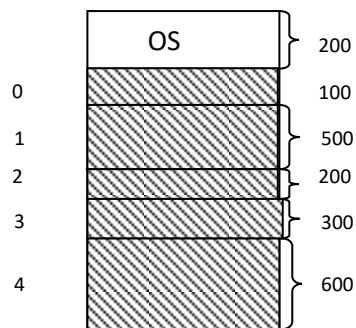
QUESTION TWO [20 MARKS]

a) Define the following terms as used in Operating Systems.
   i.   Multitasking and Multiprogramming.   [4 marks]
   ii.   Batch processing and multiprocessor   [4 marks]

b) Distinguish between the following terms

   i.   Critical sections and Race conditions   [4 marks]

   ii.   Process and thread   [4 marks]

c) Discuss inter-Process Communication (IPC)   [4marks]

QUESTION THREE [20 MARKS]

a) Compare demand paging and segmentation? [4 marks]

b) What are the three main purposes of an Operating System? [6 marks]

c) List three examples of deadlocks that are not related to a computer system environment. [6 marks]

d) List any FOUR reasons for termination of a process. [4 marks]

QUESTION FOUR [20 MARKS]

a) Explain Virtual memory [2 marks]

b) Compare paging and segmentation with respect to how much memory the address translation structures require to convert virtual addresses to physical addresses [4 marks]

c) What is process synchronization? [4 marks]

d) What is a CPU Scheduler? [4 marks]

e) For the partitions of 100K, 500K, 200K, 300K and 600K (in-order) as shown in the figure below, place the processes of size 212K, 417K, 112K and 426K (in-order) according:

    i.   Best fit Algorithm [2marks]

    ii.   First fit algorithm [2marks]

    iii.   Worst fit algorithm [2marks]

	OS	200
0		100
1		500
2		200
3		300
4		600

QUESTION FIVE   [20 MARKS]

a) What are the FIVE major activities of an operating system in regard to process management?   [4 marks]

b) State four characteristics of a suspended process.   [8 marks]

c) Explain the following terms   [8 marks]
   i.   Throughput
   ii. Turnaround time
   iii. Waiting time
   iv. Response time