KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS
MAIN/NAKURU CAMPUS

FIRST SEMESTER, 2019/2020 ACADEMIC YEAR

EXAMINATION FOR THE BACHOLER OF SCIENCE IN COMPUTER SCIENCE/BACHOLER OF BUSINESS MANAGEMENT INFORMATION TECHNOLOGY/BACHOLER OF SCIENCE IN INFORMATION TECHNOLOGY/BACHOLER OF BUSINESS INFORMATION TECHNOLOGY

COMP 216/COMP 220: OPERATING SYSTEMS

STREAM: (Y2S2 &Y2S1) **TIME: 2:00-4:00PM**

EXAMINATION SESSION: SEP-DEC **DATE: 16/12/2019**

VENUE: KTC **COPIES: 30**

INSRUCTIONS:

1. **Answer Question 1 and any other two questions in the answer booklet provided.**
2. **Do not write on your question papers. All rough work should be done in your answer booklet.**
3. **Clearly indicate which question you are answering.**
4. **Write neatly and legibly.**
5. **Edit your work for language and grammar errors.**
6. **Follow all the instructions in the answer booklet**

QUESTION ONE (30 marks)

a) Sometimes it is difficult to explicitly define what an Operating System is, based on the following terms, explain how an Operating System makes a computer system useful: (6 marks)
   i) A scheduler/allocator
   ii) A multiplexor
   iii) A virtual machine

b.Discuss the relationship between operating systems and computer hardware? **(2 marks)**

ci) In relation to Operating system, explain the differences between a thread and a process **(4 marks)**

ii) Explain **three** advantages of implementing threads in the user space (**3 marks)**

d. With respect to CPU scheduling processes, there are two types of processes, Preemptive and Non-Preemptive Scheduling. Explain the differences between them **(6 marks)**

e.i) Shown in table 1, are processes in the **ready queue** with their burst times/slice times once they get to the CPU. Calculate their turnaround time and average waiting time in terms of both ***FCFS*** and ***SJF*** algorithms **(4 marks)**

PROCESS	BURST TIME
P1	8
P2	4
P3	4
P4	4

Table 1: Process scheduling.

ii) What would be the problem associated with ***Non pre-emptive SJF***?**(2 marks)**

f. With respect Operating Systems, explain the differences between physical address and logical address **(3 marks)**

SECTION B. TOTAL MARKS FOR THIS SECTION IS 40.

ANSWER ANY TWO QUESTIONS FROM THIS SECTION. EACH QUESTION IN THIS SECTION CARRIES 20 MARKS.

QUESTION TWO (20 MARKS)

a. i.)Identify **four** conditions that must be present for a deadlock to occur **(4 marks**)

ii) Discuss **four** strategies the Operating System uses to deal with deadlocks **(4 marks)**

b. Explain **five** key differences between a Deadlock and Starvation in Operating system **(5 marks)**

ii) Once a deadlock has occurred, explain any three strategies that the operating system can use to solve the problem

c. Why are system calls needed in operating system? **(3 marks)**

d. In relation to Operating system, explain the differences between Contiguous memory allocation and Non-contiguous memory allocation. **(4 marks)**

QUESTION THREE (20 marks)

a. Identify the differences between the following processes: **(4 marks)**

i) CPU Bound (ii) I/O Bound Processes

b. If you have just been hired by a newly established organization and you want to purchase a new operating system for your organization, what factors would you consider when choosing an Operating System? **(4 marks)**

c. Explain the concepts of round robin scheduling algorithm in relation to either preemptive or non-preemptive. **(4 marks)**

d. Explain the concepts of Process Synchronization **(4 marks)**

e. Explain the differences between Transaction processing and Batch processing **(4 marks)**

QUESTION FOUR (20 marks)

a. Describe the following **two** page replacement algorithms: **(4**marks**)**

i) Least Recently Used
ii) FIFO

b. Explain ***four*** advantages of multiprogramming **(4** marks**)**
c. Describe the concepts of ***demand paging*** **(4**marks**)**
d. Explain **four** occasions when the Operating is involved with **paging** (**8** marks)

QUESTION FIVE (20 marks)

a. Explain the following four memory allocation algorithms:
i.) **First-Fit** (2 marks)
ii) **Next-Fit** (2 marks)
iii) **Best-Fit** (2 marks)
iv) **Worst-Fit** (2 marks)

b. Identify **four** conditions under which the CPU scheduling decision takes place **(4 marks)**
c. An Operating System is responsible for a number of tasks one of which is **Memory** management. Explain **four** tasks that an Operating System do with regards to Memory Management. **(4 marks)**

d. Identify and **explain** four desirable qualities of an Operating System **(4 marks)**