MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 121: OPERATING SYSTEMS

DATE: 7/12/2020 **TIME: 2:00 – 4:00 PM**

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a) Define system call. (2 marks)

b) What advantages do kernel threads provide over user threads? (4 marks)

c) Address binding of instructions and data to memory addresses can happen at three different stages. Briefly Explain the three stages (6 marks)

d) Assume, we have the workload as shown below. All 5 processes arrive at time 0, in the order given below. The length of the CPU burst time is given in milliseconds

Process: P1 P2 P3 P4 P5

Burst time: 10 29 3 7 12

Considering the FCFS, SJF and RR (q=10 ms) scheduling algorithms, which algorithm would give the minimum average turnaround time. (18 marks)

QUESTION TWO (20 MARKS)

a) What is kernel as used in an Operating System? (2 marks)

b) Give a distinction between Dynamic Loading and Dynamic Linking as used in operating systems process management (4 marks)

c) Explain the three requirements that must be satisfied by critical section problem. (6 marks)

d) The hardware and software elements of the computer's I/O system consist of a number of layers separating the user at one end the physical devices at the other end. By the aid of a well labeled diagram, show how this is achieved. (8 marks)

QUESTION THREE (20 MARKS)

a) In an efficient memory management, a Demand Paging scheme where the page replacement is used to make the frame free if they are not in use. If no frame is free then other process is called in. State two advantages and two disadvantages of this scheme? (4 marks)

b) The I/O with computer systems can be roughly grouped into three categories. Classify these groups? (6 marks)

c) Discuss the objectives for operating systems device management (10 marks)

QUESTION FOUR (20 MARKS)

a) Describe four general strategies for dealing with deadlocks. (4 marks)

b) The DMA unit is capable of mimicking the processor and, indeed, of taking over control of the system bus just like a processor. It needs to do this to transfer data to and from memory over the system bus. Give an explanation on how this is done. (8 marks)

c) When the disk drive is operating, the disk is rotating at constant speed. To read or write, the head must be positioned at the desired track and at the beginning of the desired sector on that track. Explain the following terms as used with respect to this analogy. (8 marks)

QUESTION FIVE (20 MARKS)

a) List 3 different types of scheduling queues. (6 marks)

b) Describe the conditions that lead to a deadlock (8 marks)

c) Give the queuing diagram representing process scheduling and show the action point for the different types of CPU schedulers. (8 marks)