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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR TWO**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY**

**FOR THE DEGREE OF BACHELOR OF INFORMATION SCIENCE**

**COURSE CODE: INS 202**

**COURSE TITLE: OPERATING SYSTEM**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 17/02/2020 TIME: 2.00-4.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Define the following terms
   1. Operating system **[2 marks]**
   2. Deadlock **[2 marks]**
2. Differentiate the following terms **[6 marks]**
   1. Turnaround time and waiting time
   2. pre-emptive and non-pre-emptive
   3. programmed and interrupt modes
3. Explain five characteristics of future operating system **[5 marks]**
4. Explain five objectives of allocation in short term scheduling **[5 marks]**
5. Explain the roles of operating system in
   1. Memory management **[5 marks]**
   2. File management **[5 marks]**

**QUESTION TWO**

1. Explain the role of operating system in process management **[6 marks]**
2. Explain the following techniques applied to increase the performance of disk system
   1. Disk caching **[2 marks]**
   2. Raid disks **[2 marks]**
   3. Blocking **[2 marks]**
3. With the help of a diagram differentiate between programmed mode and DMA mode of data transfer **[8 marks]**

**QUESTION THREE**

1. Differentiate the following terms **[6 marks]** 
   1. Paging and segmentation
   2. Internal fragmentation and external fragmentation
   3. Virtual memory and contiguous memory
2. Explain four algorithms used by memory manager to allocate a new created or swapped in process. **[8 marks]**
3. Examine the following table of resource requirements for four processes and determine whether the current allocation is a safe state to avoid a deadlock. Account for your answer  **[6 marks]**

|  |  |  |
| --- | --- | --- |
| Process | max needs | current usage |
| P1 | 7 | 3 |
| P2 | 4 | 1 |
| P3 | 6 | 2 |
| P4 | 6 | 1 |

Available resources = 3

**QUESTION FOUR**

1. Explain three functions of I/O module **[6 marks]**
2. Explain four features in windows operating system **[4 marks]**
3. With the help of a flow chart explain the concept of interrupts in I/O submodule  **[6 marks]**

**QUESTION FIVE**

1. Explain four mechanism used by operating system to offer security in computer system **[8 marks]**
2. The table below shows jobs submitted for execution in a computer system with Time-sharing Capability

Process Arrival Time Burst Time

p1 0 3

p2 1 5

p3 3 2

p4 9 5

P5 12 5

The Arrival Time and CPU burst are in arbitrary units. Using the table

1. Construct Gantt Chart for FCFS, SJF, SRTN and RR (Time slice-3) scheduling algorithms and work out the average waiting time **[8 marks]**
2. Which of the algorithms provide optimal values for the Average Waiting Time? Is it consistent with your expectation? Explain **[4 marks]**