

**A-0881**

**Total Pages : 4**

**Roll No. -----**

**MCS-504/MIT (CS)-304**

**Operating System/Introduction to Operating  
System**

(MCA/MSCT/MSCCS)

1<sup>st</sup>/ 3<sup>rd</sup> Semester Examination 2024(Dec.)

Time: 2:00 hrs

Max. Marks: 70

Note : This paper is of Seventy (70) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

P.T.O.

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## **Section-A (Long-Answer-Type Questions)**

Note : Section 'A' contains Five (05) long-answer-type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

[2x19=38]

- Q.1. Discuss the role of file systems in operating systems. Explain file storage management and the concept of file control blocks.
- Q.2. Explain the queuing model for process scheduling. How does exponential averaging help estimate completion time?
- Q.3. Describe thrashing in memory management. What are the techniques used to prevent thrashing?
- Q.4. Discuss the structure and functionalities of a microkernel in the context of operating systems.
- Q.5. A disk has 200 tracks numbered from 0 to 199. The disk head is currently positioned at track 50 and is moving toward higher-numbered tracks. The queue of pending requests is as follows:  
82, 170, 43, 140, 24, 16, 190

Calculate the total head movement for each of the following disk scheduling policies:

First-Come-First-Served (FCFS)

Shortest Seek Time First (SSTF)

SCAN (Elevator Algorithm)

C-SCAN (Circular SCAN)

### **Section-B (Short-Answer-Type Questions)**

Note : Section 'B' contains Eight (08) short-answer-type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only.

[4x8=32]

- Q.1. What are the differences between parallel computing and real-time systems?
- Q.2. What are the common challenges associated with TLB in multi-core processors?

P.T.O.

- Q.3. Describe the fork ( ) system call and its role in process creation.
- Q.4. What are the necessary conditions for deadlocks?
- Q.5. Consider a system with the following characteristics:  
  
TLB Hit Ratio : 90%, TLB Access Time: 20 ns,  
Memory Access Time: 100 ns  
  
Calculate the effective memory access time (EMAT) in the system. If the TLB hit ratio drops at 80%, calculate the new EMAT.
- Q.6. Explain the concept of segmentation in memory management.
- Q.7. What is the role of the virtual file system (VFS) in Linux?
- Q.8. Compare and contrast shared memory and message-passing mechanisms for IPC.

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