23-11-2024(E)

SOMAIYA VIDYAVIHAR UNIVERSITY

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| **Semester: July 2024 –November 2024** | | |
| **Maximum Marks: 100** **Examination: ESE Examination** | | **Duration:3 Hrs.** |
| **Programme code: 03** **Programme: B.Tech** | **Class:TY** | **Semester: V (SVU 2020)** |
| **Institute: K. J. Somaiya School of Engineering** | **Name of the department:** EXTC | |
| **Course Code: 116U03E513** | **Name of the Course: Operating Systems** | |
| **Instructions: 1)Draw neat diagrams 2) All questions are compulsory** **3) Assume suitable data wherever necessary** | | |

| Que. No. | Question | Max. Marks |
|---|---|---|
| Q1 | Solve any **Four** | **20** |
| i) | Describe the process of booting an OS. | 5 |
| ii) | Explain files in relation with File access methods. | 5 |
| iii) | Differentiate between user level thread and kernel level thread. | 5 |
| iv) | What is demand paging, and how does it differ from pre-paging? | 5 |
| v) | What is a system call? List some common system calls. | 5 |
| vi) | Define the term Operating System (OS), and what are its primary functions? | 5 |

| Que. No. | Question | Max. Marks |
|---|---|---|
| Q2 A | Solve the following | 10 |
| i) | Describe the key characteristics of a Real-Time Operating System. | 5 |
| ii) | How does an RTOS handle multitasking compared to a general-purpose OS? | 5 |
| | OR | |
| Q2 A | What are interrupts, and how do they work in an OS? | 10 |
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| Q 2 B | Solve any **One** | 10 |
| i) | What is a kernel? Differentiate between monolithic and microkernel. | 10 |
| ii) | Explain clearly paging and segmentation based memory management techniques using diagram. | 10 |

| Que. No. | Question | Max. Marks |
|---|---|---|
| Q3 | Solve any **Two** | **20** |
| i) | Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The initial head position is at **53th** cylinder. The queue of pending requests in FIFO is 99, 184, 38, 121, 15, 125, 68 and 71. Calculate average seek time for each of the following algorithm. (Assume: 15ms required to move 1 cylinder)<br>**Given:**-Previous Arm request=25<br>1. FCFS 2. SSTF 3. SCAN 4. C-SCAN | 10 |
| ii) | Explain Rate monotonic Algorithm (RMA) & also give important criteria (necessary and sufficient conditions) to check schedulability of a task set under RMA. | 10 |
| iii) | Differentiate between contiguous, linked, and indexed file allocation methods. | 10 |

| Que. No. | Question | Max. Marks |
|---|---|---|
| Q4 | Solve any **Two** | 20 |
| i) | What is disk Arm Scheduling? What are the various disk scheduling algorithms? Explain the criteria for selecting the best scheduling algorithm. | 10 |
| ii) | What is RAID, explain any 5 RAID levels. | 10 |
| iii) | Explain the types of file directory system. | 10 |

| Que. No. | Question | Max. Marks |
|---|---|---|
| Q5 | Solve any **four** | 20 |
| i) | Write a note on virtual memory. | 5 |
| ii) | Define mutual exclusion. What are some methods to achieve it? | 5 |
| iii) | Explain what a page table is and its role in memory management. | 5 |
| iv) | What is a critical section, and how is it managed? | 5 |
| v) | Compare pre-emptive and non pre-emptive scheduling algorithm | 5 |
| vi) | Write a note on UNIX goals. | 5 |