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MANIPAL INSTITUTE OF TECHNOLOGY
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## V SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

## END SEMESTER MAKEUP EXAMINATIONS, DECEMBER 2018

SUBJECT: OPERATING SYSTEMS [CSE 3102]

**REVISED CREDIT SYSTEM**
**(30/12/2018)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

- Answer **ALL FIVE** questions.
- Missing data may be suitable assumed.

**1A.** What are the responsibilities of the operating system with respect to process management and memory management? **3M**

**1B.** What is system call? What are the different types of system calls? **3M**

**1C.** With neat diagram, explain the queueing diagram and its significance in process scheduling. Briefly explain the role of short term scheduler and long term scheduler. **4M**

**2A.** What are the advantages of using thread pools? Explain the scheduler activation scheme for communication between user thread library and kernel with neat diagram. **4M**

**2B.** Calculate the average turnaround time, average waiting time and draw the Gantt chart for the following snap shot shown in Table Q. 2B using pre-emptive priority algorithm. **3M**

Table Q.2B.

| Process | Arrival Time | Burst Time | Priority |
|---|---|---|---|
| P1 | 3 | 8 | 3 |
| P2 | 1 | 4 | 1 |
| P3 | 2 | 9 | 4 |
| P4 | 0 | 5 | 5 |

**2C.** Explain Access matrix with copy rights along with its variation **3M**

**3A.** Describe any two requirements that the solution to critical section problem must satisfy. Give the Peterson's solution to critical section problem and show that it satisfies all the three requirements of the solution to critical section problem. **4M**

**3B** Explain the ways on which deadlocks can be prevented from occurring. **3M**

**3C.** Give the solution to the critical section problem using semaphores and the definition of the operations associated with it. **3M**

**4A.** A variable-partition multiprogramming system uses a free memory list to track available memory. The current list contains entries of 150KB, 360KB, 400KB, 625KB, and 200KB. The system receives requests for 215KB, 171KB, 86KB, and 481KB, in that order. Describe the final contents of the free memory list if the system used each of the following memory placement strategies.

(i) Best-fit
(ii) Worst-fit

**3M**

**4B** How Thrashing occurs? Explain how it can be handled by working set model and page fault frequency techniques? **3M**

**4C** How LRU can be approximated by Second-Chance algorithm for computer systems which doesn't provide sufficient hardware support true LRU page replacement? In what way it can be enhanced by considering the modify bit? **4M**

**5A.** Explain the single and two level directory structure with the required diagram. Give at least one disadvantage of each structure **3M**

**5B.** Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 2150, and the previous request was at cylinder 1805. The queue of pending requests in FIFO order is 2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4695, 3681.Starting from the current head position, what is the total distance(in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms? **4M**

i) FCFS
ii) SSTF

iii) SCAN
iv) C-LOOK

**5C** Discuss the Process Model in Linux with respect to process identity, process environment and process context . **3M**