

Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala
Department of Computer Science and Engineering

Auxiliary Exam

Course Code: UCS303

B.E. COE/CSE (Second Year): Semester-III

Course Name: Operating Systems

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Note: Attempt all parts of a question at one place. Assume missing data, if any, suitably.

- Q.1** Consider the following snapshot of an operating system required to schedule the execution of the processes: (10)

Processes	Arrival Time (in ms)	Burst time (in ms)	Priority
P ₁	0	10	5 (Lowest)
P ₂	0	5	2
P ₃	2	3	1 (Highest)
P ₄	5	20	4
P ₅	10	2	3

Calculate average waiting and turnaround time for the following scheduling policies:

- SJF
 - SRTF
 - Priority with preemption
 - Priority without preemption
- Q.2** Differentiate between user-level and kernel level threads. With appropriate diagrams, explain different multithreading models. (4+6)
- Q.3** a) Discuss critical section problem and three necessary conditions for solution to the Critical Section Problem. (5)
- b) Consider two processes P_i and P_j are executing below code, with the current process being process i and the other process being process j. Does the following proposed solution to the critical section problem for two processes guarantee all the three necessary conditions? Give proper justification. (5)

```

int turn = 0;                //shared variable
int flag[2] = {false, false}; //shared variable
//Entry section
turn = j;
flag[i] = true;
while (flag[j])
{
    flag[i] = false;
    while (turn != i);
    flag[i] = true;
}
// Critical section
//Exit section
flag[i] = false;

```

- Q.4** There are 100 cylinders numbered 0-99. What is the total number of head movements for C-LOOK and SCAN algorithms if the head pointer is currently at cylinder 15 and it is moving in forward direction? The requests are as follows: 2, 10, 5, 52, 33, 42, 81, 77, 22, 8, 14 **(5+5)**
- Q.5** Consider a RAM of 3 frames and calculate the number of page faults in the following reference string using second chance and LRU page replacement algorithms. **(5+5)**
0, 4, 1, 4, 2, 4, 3, 4, 2, 4, 0, 4, 1, 4, 2, 4, 3, 4
Assume that all the page frames are initially empty.