PAPER ID—21143

B. Tech. (Computer Science Engineering) EXAMINATION, 2024

(Fourth Semester)

OPERATING SYSTEM

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Define the threads and its type.

   (b) What is Critical section Problem and its solution ?

   (c) Write the conditions for Preemptive and Non-Preemptive scheduling.

   (d) Explain the different File access modes.

   (e) Explain the Optimal page replacement with example.

   (f) What is Real time OS ?

   (g) Explain the turnaround time and waiting time in OS. **2×7=14**

Section A

2. (a) What is Operating System (OS) ? Explain the needs and services of the OS in detail. **7**

   (b) What is Process Control Block ? Also explain the Process State Transitions in detail. **7**

3. Consider the set of 5 processes whose arrival time and burst time are given below : **14**

Process id	Arrival time	Burst time
P1	0	5
P2	1	3
P3	2	1
P4	3	2
P5	4	3

(a) If the CPU scheduling policy is Round Robin with time quantum = 2 unit, calculate the average waiting time and average turnaround time.

(b) If the CPU Scheduling is Shortest Job First, calculate the average waiting time and average turnaround time.

Section B

4. Describe the Race condition. Also explain the Producer consumer Problem and Peterson algorithm for the solution of critical section problem. **14**

5. (a) What is deadlock ? Explain the necessary and sufficient condition for the occurrence of deadlock. 7

(b) Explain the Bankers Algorithm for Deadlock Avoidance. 7

Section C

6. Explain the Paging in detail and also its hardware for the support of paging. **14**

7. (a) What do you mean by virtual memory and page fault in detail ? 7

(b) Explain the memory allocation using First Fit, Best Fit and Worst Fit algorithm in detail using examples. 7

Section D

8. Consider a disk queue with requests for I/O to blocks on cylinders 98, 183, 37, 122, 14, 124,

65, 67. Initially the R/W head is at 53. Calculate the total movement of head using : 7

(a) C-SCAN

(b) LOOK

Also, show using the diagram how the head moves between various blocks of cylinder 7

9. Explain in detail the difference between the UNIX and WINDOWS operating System. 14