VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
ODD MID SEMESTER EXAMINATION FOR ACADEMIC SESSION 2024-25

COURSE NAME: B. TECH

SEMESTER:5TH

BRANCH NAME: CSE

SUBJECT NAME: OPERATING SYSTEM

FULL MARKS: 30

TIME: 90 MINUTES

Answer All Questions.
The figures in the right-hand margin indicate Marks.

Q1. **Answer all Questions.** [2 × 3]

a) What characteristic is common to traps, interrupts, supervisor calls and subroutine calls? - CO1

b) Given a system with n processes, how many possible ways can those processes be scheduled? - CO2

c) Explain the function of following UNIX command with example: **awk, grep & sed.** - CO3

Q2. [8]

a) What is swapping? Does swapping increases the degree of multiprogramming? Justify your answer. - CO1

b) Differentiate process and threads. Describe the states and state transitions of a process using a neat process state transition diagram.

OR

a) Discuss Monolithic, Microkernel architecture with neat diagram. What are the main advantages of the microkernel approach to system design? - CO1

b) What is critical section? What are the various software approaches to solve critical section problem? Discuss.

Q3. [8]

a)Discuss the function of scheduler, dispatcher, PCB & TCB? What is dispatcher latency? - CO2

b) Schedule the process using Gantt chart and calculate the average turnaround time and waiting time for the following workload using Shortest-Remaining time First Scheduling Algorithm:

Process id	CPU burst time	Arrival time
P1	3ms	0
P2	2ms	6
P3	4ms	4
P4	6ms	5
P5	2ms	8

OR

a) Discuss tightly coupled and loosely coupled system with a neat block diagram? List the advantages and disadvantages of both. - CO2

b) Define monitor. Give a monitor solution for producer consumer problem

Q4. **[8]**

a) State four necessary conditions for a deadlock to exist. Give a brief intuitive argument for the reason each individual condition is necessary. Discuss the strategies used to recover from Deadlock. - CO3

b) What is race condition? What are the methods used to avoid race condition? Discuss

OR

a) What is a semaphore? What is the need for it? Explain how semaphores and its operations can be implemented in kernel? - CO3

b) Schedule the process using Gantt chart and calculate the average turnaround time and waiting time for the following workload using RR Scheduling algorithm by considering the time quantum is 50 ns and context switching time is 10 ns.

Process id	CPU burst time
P0	350ms
P1	125ms
P2	475ms
P3	250ms
P4	75ms