VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Odd Mid Semester Examination for Academic Session 2025-26

COURSE NAME: B.TECH / SEMESTER: 3RD

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. *Symbols carry usual meaning.*

Q1. Answer all Questions. [2 × 3]

a) State any four events that may lead to process context switch in a time-sharing operating system. - CO1

b) We need special support from the hardware to provide mutual exclusion among a number of concurrent processes. Justify the statement. - CO2

c) When a process is rolled out of memory, it loses its ability to use the CPU (at least for a while). Describe another situation where a process loses its ability to use the CPU, but where the process does not get rolled out. - CO3

Q2. [3]

Consider the following set of processes. Calculate the average waiting time and average turnaround time for the following scheduling algorithms: (i) FCFS, (ii) non-preemptive SJF, (iii) pre-emptive SJF, and (iv) round-robin with time quantum of 3 msec. - CO1

Process	P1	P2	P3	P4	P5	P6
Arrival Time (msec)	0	2	3	5	6	8
CPU Burst (msec)	7	4	6	2	8	5

OR

Clearly explain how the concept of SPOOLING helps in improving CPU utilization in traditional batch processing systems. Your printer connected to your computer uses SPOOLING. Point out what problem will you face if you want to print two documents simultaneously if you disable SPOOLING? Why? - CO1

Q3. [3].

Suggest a CPU scheduling algorithm that tries to reduce the waiting time of the processes and at the same time avoids starvation. Comment on whether the algorithm will give preference to processes with short CPU bursts or long CPU bursts. - CO2

OR

Consider a demand paging system with four-page frames (initially empty) and LRU page replacement policy. For the following page reference string find the page fault rate which is defined as the ratio of number of page faults to the number of memory accesses (rounded off to one decimal place)? - CO2

Page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3

PTO

Q4. [8]

If there are 6 units of resource R in the system and each process in the system requires 2 units of resource R, then how many processes can be present at maximum so that no deadlock will occur? - CO3

OR

Clear explain the differences between the following with the help of examples: - CO3

(i) System call, (ii) Exception, (iii) Internal hardware interrupt.