



Mid Term (Odd) Semester Examination October 2024

Roll no. 2294038

Name of the Course and semester: B. TECH Vth SEM

Name of the Paper: OPERATING SYSTEM

Paper Code: TCS-502

Time: 1.5 hour

Maximum Marks: 50

Note:

- (i) Answer all the questions by choosing any one of the sub questions
- (ii) Each question carries 10 marks.
- (iii) Please specify COs against each question.

Q1.

(10 Marks)

a. Explain the major functions of an Operating System (OS) and its role in system performance. (CO1)

OR

b. Describe the layered structure of an Operating System with a suitable diagram. (CO1)

Q2.

(10 Marks)

a. What are system calls in an Operating System? Explain the types of system calls with examples. (CO1)

OR

b. Explain the Unix command structure, including internal and external commands with examples. (CO1)

Q3.

(10 Marks)

a. Discuss the different types of Operating Systems, providing examples for each. Explain their key characteristics. (CO1)

OR

b. Explain the need of process synchronization. How can the inter process communication be achieved. (CO2)

Q4.

(10 Marks)

a. A system has the following processes to be executed with their respective arrival times and burst times:

process	Arrival time	Burst time
P1	0	7
P2	2	4
P3	4	1
P4	5	4
P5	6	3

Perform the CPU scheduling using the following algorithms:

1. FCFS (First Come First Serve)



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2. SJF (Shortest Job First - Non-preemptive)
3. SRTF (Shortest Remaining Time First - Preemptive)
4. Round Robin (RR) with a time quantum of 2 ms

Calculate the Average Waiting Time (AWT) and Average Turnaround Time (ATAT) for each algorithm.
(CO2)

OR

- b. What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore. (CO2)

Q5.

(10 Marks)

- a. A system has a counting semaphore S initialized to 5. There are 3 processes P_1 , P_2 , and P_3 that execute the following sequence: (CO2)
 - P_1 executes 2 wait(S) operations.
 - P_2 executes 3 wait(S) operations.
 - P_3 executes 1 wait(S) operation.

After the execution of the above operations:

- P_1 executes 1 signal(S) operation.
- P_2 executes 2 signal(S) operations.

Find:

- (a) The value of the semaphore after all the operations.
- (b) Which processes, if any, are blocked?

OR

- b. Draw and explain the Process State Diagram and the Role of the Scheduler.