

26/12



PRN:

Term End Examination

Dec 2023

CET2003B - Operating Systems

Question Paper ID: 027171

Faculty/School	Engineering and Technology	Term	Semester III
Program	SY B.Tech CSE/AIDS/CSF	Duration	2 Hours 30 Minutes
Specialization		Max. Marks	70

Section - 1 (7 X 10 Marks)

Answer any 7 questions

Answer any 4 questions

1	Explain five OS components in detail.[10 Marks]	10 marks	CO1	Understanding																		
2	<p>Consider the following set of processes. Calculate the completion time (CT), turnaround time (TAT) and waiting time (WT) for each process using First come first serve (FCFS-Non-preemptive) job scheduling algorithm. Also, draw the Gantt chart.[10 Marks]</p> <table><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th></tr><tr><td>P1</td><td>0</td><td>3</td></tr><tr><td>P2</td><td>2</td><td>6</td></tr><tr><td>P3</td><td>4</td><td>4</td></tr><tr><td>P4</td><td>6</td><td>5</td></tr><tr><td>P5</td><td>8</td><td>2</td></tr></table>	Process	Arrival Time	Burst Time	P1	0	3	P2	2	6	P3	4	4	P4	6	5	P5	8	2	10 marks	CO2	Understanding
Process	Arrival Time	Burst Time																				
P1	0	3																				
P2	2	6																				
P3	4	4																				
P4	6	5																				
P5	8	2																				
3	<p>(a) Describe the Reader Writer's classical semaphore problem.[4 Marks]</p> <p>(b) Discuss the solution(pseudo code) for the Reader Writer's problem using semaphores [6 Marks]</p>	10 marks	CO3	Understanding																		
4	<p>(a) Define the following terms related to concurrency: [5 Marks]</p> <p>(i) Mutual Exclusion</p> <p>(ii) Race condition</p> <p>(iii) Atomic Operation</p> <p>(iv) Critical section</p> <p>(v) Starvation</p> <p>(b) Define a deadlock. Explain the necessary conditions for a deadlock to occur. [5 Marks]</p>	10 marks	CO3	Remembering																		

5	<p>Suppose we want to synchronize two concurrent processes P and Q using binary semaphores S1 and S2. The code for the processes P and Q is shown below.</p> <p>Process P:</p> <pre>while(1) { P(S1); P(S2); Critical Section V(S1); V(S2); }</pre> <p>Process Q:</p> <pre>while(1) { P(S1); P(S2); Critical Section V(S1); V(S2); }</pre> <p>Justify whether it results in starvation, deadlock or mutual exclusion. [10 Marks]</p>	10 marks	CO3	Applying
6	<p>(a) Define the following terms with respect to paging [5 Marks]</p> <ul style="list-style-type: none"> (i) Page (ii) Frame (iii) Thrashing (iv) Temporal Locality (v) Page fault <p>(b) Compare Paging and Segmentation (any five points). [5 Marks]</p>	10 marks	CO4	Remembering
7	<p>(a) Explain four key differences amongst the types of I/O devices.[4 Marks]</p> <p>(b) Explain four types of I/O buffering schemes with diagrams.[6 Marks]</p>	10 marks	CO4	Remembering

8	<p>(a) Define the following terms with respect to Disk Scheduling: [4 Marks]</p> <p>(i) Seek Time</p> <p>(ii) Rotational Latency</p> <p>(iii) Transfer time</p> <p>(iv) Disk Access Time</p> <p>(b) Consider the following disk request sequence 86,1470,913,1774,948,1509,1022,1750,130 for a disk with 2000 tracks starting from the current head position at 125. Find the number of head movements in tracks and average seek time using SSTF and C-SCAN scheduling. Plot the graphs for the same. [6 Marks]</p>	10 marks	CO4	Understanding
9	<p>(a) Write a shell script program to print the multiplication table of a given number [4 Marks]</p> <p>For Example, if the given input is 4 then the output should be</p> <p>4*1=4</p> <p>4*2=8</p> <p>:</p> <p>:</p> <p>4*10=40</p> <p>(b) Explain conditional control structure syntax with a proper example for: [6Marks]</p> <p>(i) if structure</p> <p>(ii) case structure.</p>	10 marks	CO5	Understanding
10	Draw and Explain the block diagram of the UNIX system kernel. [10 Marks]	10 marks	CO5	Understanding

END OF QUESTION PAPER