

Code No: P18CST09

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

III B.TECH I SEMESTER END REGULAR EXAMINATIONS, DEC/JAN – 2022/23

OPERATING SYSTEMS

(Common to CSE CSIT, IT, CSE(IOTCSBT) Branches)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M).

Q.No.	Questions	Marks	CO	KL
1.	a) In a system, if a parent process terminates then all its children must also be terminated. Identify the phenomenon.	[2M]	1	3
	b) Recall the CPU scheduling strategy which could result in convey effect?	[2M]	2	1
	c) What do you understand by resource allocation graph (RAG)? Explain using suitable examples.	[2M]	3	2
	d) Discuss the effect of thrashing?	[2M]	4	2
	e) What are the various layers of a file system?	[2M]	5	2

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.	Questions	Marks	CO	KL																
UNIT-I																				
2.	a) Define system call. Explain different types of system calls.	[5M]	1	1																
	b) What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain.	[5M]	1	2																
3.	a) Describe operating system services briefly.	[5M]	1	2																
	b) With a neat sketch explain the state changes in process control block when context switching occurs.	[5M]	1	2																
UNIT-II																				
4.	a) Given the following processes and burst times. For each of the following scheduling algorithms, construct the Gantt chart depicting the sequence of process execution and calculate the average waiting time and turnaround time of each algorithm. i. FCFS ii. SJF. Which scheduling algorithms can lead to starvation and suggest a solution. <table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th>Process</th><th>Burst Time</th></tr></thead><tbody><tr><td>P1</td><td>13</td></tr><tr><td>P2</td><td>5</td></tr><tr><td>P3</td><td>23</td></tr><tr><td>P4</td><td>3</td></tr><tr><td>P5</td><td>31</td></tr><tr><td>P6</td><td>3</td></tr><tr><td>P7</td><td>14</td></tr></tbody></table>	Process	Burst Time	P1	13	P2	5	P3	23	P4	3	P5	31	P6	3	P7	14	[5M]	2	2
Process	Burst Time																			
P1	13																			
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P3	23																			
P4	3																			
P5	31																			
P6	3																			
P7	14																			
	b) Demonstrate a solution for Readers-Writers problem using semaphores and discuss the issues related to your proposed solution.	[5M]	2	2																
OR																				



5.	a)	What is a semaphore? List the types of semaphores and show that, if the wait() and signal() semaphore operations are not executed automatically, then mutual exclusion may be violated.	[5M]	2	2																																																																																										
	b)	Explain the Round Robin Scheduling Algorithm with suitable example.	[5M]	2	2																																																																																										
UNIT-III																																																																																															
6.	a)	Consider the following snapshot of a system: <table border="1" style="margin: 10px auto;"> <thead> <tr> <th rowspan="2">Process</th> <th colspan="4">Allocation</th> <th colspan="4">Max</th> <th colspan="4">Available</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>P0</td> <td>3</td> <td>0</td> <td>2</td> <td>1</td> <td>4</td> <td>2</td> <td>4</td> <td>2</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>P1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>2</td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>P2</td> <td>1</td> <td>2</td> <td>0</td> <td>0</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>P3</td> <td>0</td> <td>1</td> <td>1</td> <td>2</td> <td>1</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>P4</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>2</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>i) What is the content of the matrix Need ii) Is the system in a safe state? If yes, give a safe sequence of processes. If not, explain why the system is not in a safe state iii) If a request from process P4 arrives for (1,0,0,0), can the request be</p>	Process	Allocation				Max				Available				A	B	C	D	A	B	C	D	A	B	C	D	P0	3	0	2	1	4	2	4	2	1	0	0	0	P1	0	1	0	1	0	2	2	2					P2	1	2	0	0	3	2	1	0					P3	0	1	1	2	1	1	1	2					P4	0	0	1	1	1	0	2	1					[5M]	3	2
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P4	0	0	1	1	1	0	2	1																																																																																							
	b)	Explain deadlock detection with example.	[5M]	3	2																																																																																										
OR																																																																																															
7.	a)	Discuss different deadlock prevention methods with examples.	[5M]	3	6																																																																																										
	b)	Differentiate the deadlock handling methods.	[5M]	3	4																																																																																										
UNIT-IV																																																																																															
8.	a)	Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?	[5M]	4	2																																																																																										
	b)	Discuss about Structure of page table.	[5M]	4	6																																																																																										
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9.	a)	Illustrate FIFO and Optimal page Replacement algorithms with the following page reference string. 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. (Assume Frame Size=3)	[5M]	4	2																																																																																										
	b)	Discuss the similarities and differences between paging and fragmentation.	[5M]	4	6																																																																																										
UNIT-V																																																																																															
10.	a)	Discuss about file sharing and protection.	[5M]	5	6																																																																																										
	b)	Compute the total number of head movements needed to satisfy the following sequences using SSTF and SCAN disk scheduling policies, 27,129,110,186,147,41,10,64,120. Assume that the disk head is initially positioned over track 100 and is moving in the direction of decreasing track number.	[5M]	5	3																																																																																										
OR																																																																																															
11.	a)	Explain the file system structure.	[5M]	5	2																																																																																										
	b)	Describe the most common schemes for defining the logical structure of a directory.	[5M]	5	3																																																																																										
