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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

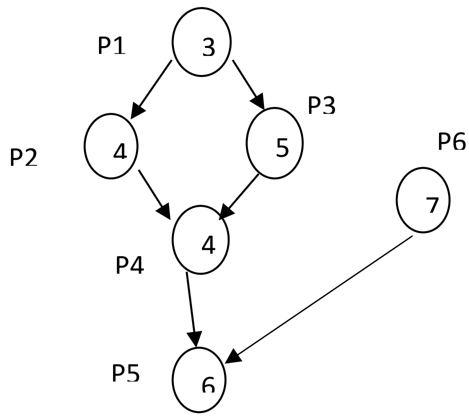
Programme: B.E. | **Semester: VI**
Branch: Electronics & Telecommunication Engineering | **Duration: 3 hrs.**
Course Code: 22ET6PE2OS | **Max Marks: 100**
Course: Operating Systems

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	With diagram explain operations of a multiprogramming system	CO1		**06**
	b)	Schedule operations of time sharing system having 10msec CPU time for three programs P1, P2 and P3. Programs have a cyclic behavior and each cycle containing a burst of CPU and I/O activity <table><tr><td>Processes</td><td>CPU burst(msec)</td><td>I/O Burst(msec)</td></tr><tr><td>P1</td><td>15</td><td>100</td></tr><tr><td>P2</td><td>20</td><td>40</td></tr><tr><td>P3</td><td>30</td><td>60</td></tr></table>	CO2	PO1	**08**
	c)	Define resource allocation. Explain the two popular strategies for resource allocation	CO1		**06**
		OR			
2	a)	With diagram explain Batch processing system	CO1		**07**
	b)	Explain real time system with its types	CO1		**06**
	c)	With diagram explain abstract view of an operating system	CO1		**07**
		UNIT - II			
3	a)	With a neat diagram and an example explain heap and stack structure	CO1		**06**

b) Explain three approaches of real time scheduling. For the following PPG calculate the deadline of individual processes. — *CO2* | *PO1* | **06**



c) Consider the following processes apply RR scheduling policy with δ = 1sec. Calculate mean turn-around time and Mean Weighted turn-around time and plot it — *CO2* | *PO1* | **08**

Process	P1	P2	P3	P4	P5	P6	P7
Arrival time (sec)	0	2	2	4	5	6	8
Service time (sec)	4	3	2	5	3	2	3

OR

4 a) Free list contains two free areas of size 250 and 450 bytes. A process make allocation request for 150, 60 and 350 bytes. Explain using First fit, best fit and next fit techniques — *CO2* | *PO1* | **06**

b) Explain with a neat diagram Buddy system & power of 2 allocator — *CO1* | **07**

c) Consider the following processes apply FCFS scheduling policy and calculate mean turn-around time and Mean Weighted turn-around time and plot it — *CO2* | *PO1* | **07**

Process	P1	P2	P3	P4
Arrival time (sec)	0	1	2	3
Service time (sec)	3	4	2	5

UNIT - III

5 a) With diagram explain different multithreading models — *CO1* | **06**

b) Write a C program to demonstrates how to create a zombie Process — *CO2* | *PO1* | **06**

c) For the given page reference string and reference time strings use that First In First Out (FIFO) page replacement policy to verify whether it exhibits stack property for allocation n= 3 and m=4, Justify the answer with relevant information — *CO3* | *PO2* | **08**

Page reference string: 5, 4, 1, 2, 4, 4, 3, 5, 4, 3, 2, 1, 3,
Reference time string: t1, t2, t3, t4, t5, t6, t7, t8, t9, t10, t11, t12,t13

OR

	6	a)	With state diagram explain different states of a process	*CO1*		**06**
		b)	Write a C program to demonstrates how to create an Orphan Process	*CO2*	*PO1*	**07**
		c)	For the given page reference string and reference time strings use Least Recently Used (LRU) page replacement policy to verify whether it follow principle of locality, Justify the answer with relevant information . $alloc_i$= 2 Page reference string: 0, 1, 0, 2, 0, 1, 2, 1, 2, 0 Reference time string: t1, t2, t3, t4, t5, t6, t7, t8, t9, t10	*CO3*	*PO2*	**07**
			UNIT - IV			
	7	a)	Explain race condition with an example	*CO1*		**05**
		b)	Write deadlock detection algorithm	*CO1*		**07**
		c)	A system contains three processes P1, P2, P3 and 7,7,10 resource units of resource classes R1, R2, R3. The allocation state of the system is (5, 4, 10). Process P2 has made a request (1, 1, 0) would the request be granted in the current state using Banker's algorithm.	*CO3*	*PO2*	**08**

	R1	R2	R3
P1	3	6	8
P2	4	3	3
P3	3	4	4
Max_Need			

	R1	R2	R3
P1	2	2	3
P2	2	0	3
P3	1	2	4
Allocated_ Resources			

			OR			
	8	a)	Explain process structure of Peterson's solution for critical – section problem	*CO1*		**06**
		b)	Explain the implementation structure of semaphore	*CO1*		**06**
		c)	A system has four processes P1, P2, P3, P4 and 6,4,8,5 resource unit of resource classes R1, R2, R3, and R4. Process P2 makes a request of 1 unit of resource class R4. Check whether the system is in deadlock or not	*CO3*	*PO2*	**08**

	R1	R2	R3	R4
P1	2	0	2	1
P2	1	1	2	0
P3	1	1	2	2
P4	1	1	2	1
Allocated_resources				

	R1	R2	R3	R4
P1	1	1	1	1
P2				
P3	6	3	2	2
P4	0	2	1	2
Requested resources				

R1	R2	R3	R4
1	1	0	1
Free_resources			

			UNIT – V			
	9	a)	Explain different file operation	***CO1***		**06**
		b)	With diagram explain Acyclic graph directory	***CO1***		**07**
		c)	With neat diagram explain linked allocation	***CO1***		**07**
			OR			
	10	a)	With diagram explain file system mounting	***CO1***		**06**
		b)	With neat diagram explain contiguous allocation	***CO1***		**07**
		c)	Explain different step involved in to open an file and to close an file	***CO1***		**07**

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