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Subject: Advanced Operating Systems
Code: 10M11CI212 Max. Marks: 15

Q. 1 Explain what the following path expression do: 1

a) path { open + read }; close end

b) path {openread; read}; {openwrite; write} end

Q. 2 a) Difference between guarded, alternative and repetitive commands in CSP with example. 5

b) How do serializers solve several deficiencies of monitors?

c) Shows the necessary & sufficient condition for deadlocks with different types of resources

d) What is knot in a graph and show it with an example.

e) What is Race Condition?

Q. 3 Solve the dining philosopher problem with semaphores with an example. 3

Q. 4 Construct the general resource graph for the following scenario and determine if the graph is completely reducible: 3

Resource/process	P1	P2	P3
	Allocated/Requesting		
R1 (Max: 2)	0/1	1/0	1/0
R2 (Max: 2)	1/0	0/0	1/0
R3 (Max: 3)	1/0	0/2	0/1

Q.5 Design a space-time diagram for the following scenario with vector clock: 3

P_1: $e_1, e_2, e_3, e_4, e_5, e_6, e_7, e_8, e_9, e_{10}$;

P_2: $e_1, e_2, e_3, e_4, e_5, e_6, e_7$; and the following happened before relation are captured:

$e_{12} \rightarrow e_{23}$; $e_{22} \rightarrow e_{15}$; $e_{16} \rightarrow e_{25}$; $e_{24} \rightarrow e_{17}$; $e_{10} \rightarrow e_{27}$