U.S.N.										

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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary 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.

		UNIT - I	CO	PO	Marks
1	a)	Consider multiprogramming system which has two program, P1: CPU-bound (lower priority), P2: I/O-bound (higher priority). Use timing chart to analyze the process when I/O bound program has higher priority. If P3 of I/O bound program with intermediate priority is added to above system, identify the influence of additional program P3. Justify the answer	CO3	PO2	**07**
	b)	A time sharing system contains n = 3 programs, using time slice of 5msec and each executing in a cyclic behavior as given in the following table. Schedule the processes and draw the timing diagram for one cycle. Calculate Response time (rt) and efficiency (η). Assume σ = 1msec. Processes | CPU burst(msec) | I/O Burst(msec) P1 | 10 | 80 P2 | 15 | 40 P3 | 30 | 60	CO2	PO1	**07**
	c)	Explain the features and special techniques of distributed operating system	CO1	PO	**06**
		UNIT - II			
2	a)	Consider the following processes apply HRN scheduling policy. Calculate mean turn-around time and Mean Weighted turn-around time and plot it Process | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 Arrival time (sec) | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 8 Service time (sec) | 3 | 6 | 4 | 8 | 2 | 4 | 5 | 4	CO2	PO1	**10**

<table>
<tr><td></td><td></td><td>b)</td><td>Consider the following processes apply Rate Monotonic Scheduling (RMS). Verify the condition for scheduling these processes. Calculate the Priority of each process and plot the timing chart for two cycle

<table><tr><td>Process</td><td>P1</td><td>P2</td><td>P3</td></tr><tr><td>Time Period (ms)</td><td>5</td><td>10</td><td>20</td></tr><tr><td>Service time (ms)</td><td>2</td><td>3</td><td>5</td></tr></table></td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>a)</td><td>Consider the following processes apply STG scheduling policy. Calculate mean turn-around time and Mean Weighted turn-around time and plot it
<table><tr><td>Process</td><td>P1</td><td>P2</td><td>P3</td><td>P4</td><td>P5</td></tr><tr><td>Arrival time (sec)</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Service time (sec)</td><td>9</td><td>4</td><td>5</td><td>7</td><td>3</td></tr></table></td><td>CO2</td><td>PO1</td><td>07</td></tr>
<tr><td></td><td>b)</td><td>Explain paging and Consider process P and R in a system using page size of 1 KB. Process P has the start address 0 and a size of 5500 bytes. Process R has the start address 0 and a size of 2700 bytes. Obtain the Effective memory address for the following logical addresses : (i)3328 of P process (ii)1128 of process R
<table><tr><td>Page Number</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Page frame #</td><td>1</td><td>3</td><td>9</td><td>6</td><td>7</td><td>8</td></tr></table>Page table of process P
<table><tr><td>Page Number</td><td>0</td><td>1</td><td>2</td></tr><tr><td>Page frame #</td><td>0</td><td>2</td><td>5</td></tr></table>Page table of process R</td><td>CO3</td><td>PO2</td><td>07</td></tr>
<tr><td></td><td>c)</td><td>Explain the following with relevant figure and example ,

a. External fragmentation
b. Internal fragmentation
c. Boundary tags</td><td>CO1</td><td>PO</td><td>06</td></tr>
<tr><td></td><td></td><td>UNIT - III</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>a)</td><td>A process has been allocated n= 3 and m=4 page frames. Assume that none of the pages of the process are available in the memory initially. The process makes the following sequence of page references: 1, 2, 1, 3, 7, 4, 5, 6, 3, 1. If LRU page replacement policy is used, how many page faults occur for the above reference string and to verify whether it exhibits stack property, Justify the answer with relevant information</td><td>CO2</td><td>PO1</td><td>08</td></tr>
</table>

	b)	With block diagram explain fields of process control block (PCB)	*CO1*	*PO*	**06**
	c)	With flow diagram explain process creation	*CO1*	*PO*	**06**
		UNIT - IV			
5	a)	Write Banker's algorithm	*CO2*	*PO1*	**08**
	b)	Explain process structure of Peterson's solution for critical – section problem	*CO2*	*PO1*	**06**
	c)	Explain the deadlock prevention methods	*CO1*	*PO*	**06**
		OR			
6	a)	Explain the implementation structure of semaphore	*CO1*	*PO*	**06**
	b)	In the following system total allocation: 5, 4, 10 and total exist: 7,7,10 i) Is the current allocation stat safe? ii) Would the following request be granted in the current state? I. Process P1 request (1, 1, 0) II. Process P2 request (0, 1, 0) III. Process P3 request (1, 1, 0)	*CO3*	*PO2*	**08**
	c)	Explain the condition for resource deadlock	*CO1*	*PO*	**06**
		UNIT - V			
7	a)	With neat diagram explain indexed allocation	*CO1*	*PO*	**07**
	b)	With diagram explain Acyclic graph directory	*CO1*	*PO*	**07**
	c)	Explain each layers in layered file system	*CO1*	*PO*	**06**

	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
Alloc_ resources			

******