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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**

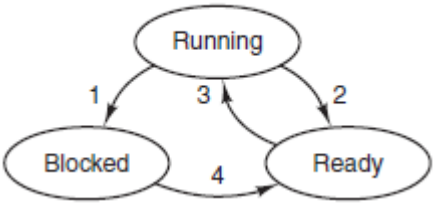
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**

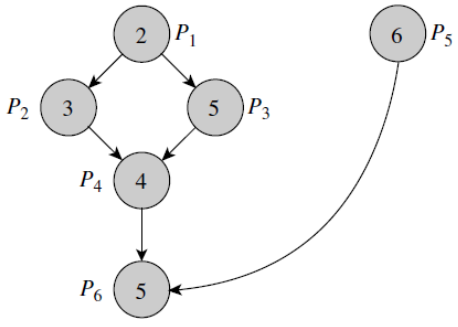
Course Code: 23EC5PE1OS / 22EC5PE1OS **Max Marks: 100**

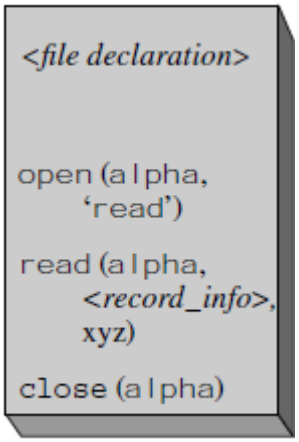
Course: Operating System

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.

		UNIT - I	CO	PO	Marks
1	a)	Compare the multiprogramming and time sharing operating system and comment on their computation speed up ability	CO 2	PO 2	10
	b)	It is required to design an operating system tailored for an application that requires subrequests to be processed and responded to within a strict and precise time frame? Provide a detailed description of this operating system.	CO 2	PO 2	10
		OR			
2	a)	Different classes of users need different kinds of user service a running a single operating system on the computer system may not address all the users what type of operating system can be designed to address the users requirements at the same time period. Describe this operating system in detail.	CO 2	PO 2	10
	b)	Differentiate the types of computation environment	CO 2	PO 2	10
		UNIT - II			
3	a)	In Figure 1, three process states are shown. In theory, with three states, there could be six transitions, two out of each state (excluding terminated state). However, only four transitions are shown. Are there any circumstances in which either or both of the missing transitions might occur? Do not consider terminated state.  Figure 1	CO 2	PO 2	10

		b)	A process is in the *blocked swapped* state. **a.** Give a sequence of state transitions through which it could have reached this state. **b.** Give a sequence of state transitions through which it can reach the *ready* state. Is more than one sequence of state transitions possible in each of these cases?	***CO 2***	*PO 2*	**10**
			OR			
	4	a)	Compare a Process Control Block(PCB) and a TCB(Thread Control Block) .	***CO 2***	*PO 2*	**10**
		b)	Write a program in C language to create 4 child processes .Let the parent create 4 child processes. Make them execute ls, ls –l, pwd and date commands. (One child executes one command).	***CO 1***	*PO 1*	**10**
			UNIT - III			
	5	a)	Differentiate Race condition and critical section with example	***CO 2***	*PO 2*	**10**
		b)	For the processes shown in the table1 implement Highest Response Ratio Next Scheduling and find the average turnaround time and weighted turnaround time. Table 1 **Process** P_1 P_2 P_3 P_4 P_5 **Admission time** 0 2 3 4 8 **Service time** 3 3 5 2 3	***CO 1***	*PO 1*	**10**
			OR			
	6	a)	Differentiate preemptive and non preemptive scheduling with an example for each type.	***CO 2***	*PO 2*	**10**
		b)	For the Process precedence graph (PPG) of a real-time application shown in Figure 2. implement earliest deadline first scheduling determine the deadline overrun if any clearly indicate the scheduling order. The application is required to produce the response in 25 seconds. Each circle in the graph represents a process. The number in a circle indicates the service time of a process  Figure 2	***CO 1***	*PO 1*	**10**

			UNIT - IV			
	7	a)	How does demand paging reduce memory usage compared to traditional paging? Describe the role of the page table in demand paging**.**	***CO** 2*	*PO 2*	**10**
		b)	A page reference string and the reference time string for a process *P* are as follows: Page reference string 0, 1, 0, 2, 0, 1, 2, . . . Reference time string *t*1, *t*2, *t*3, *t*4, *t*5, *t*6, *t*7, . . . Illustrate the working of FIFO and LRU page replacement policies considering that the memory has the space to accommodate at most two pages.	***CO** 2*	*PO 2*	**10**
			OR			
	8	a)	Compare and contrast internal fragmentation and external fragmentation in memory management. Provide examples of each.	***CO** 2*	*PO 2*	**10**
		b)	A process experiences frequent page faults. Analyze the possible reasons and suggest solutions to reduce page faults.	***CO** 2*	*PO 2*	**10**
			UNIT - V			
	9	a)	A file system uses a hierarchical structure. Analyze the advantages and challenges of this structure in large-scale systems.	***CO** 2*	*PO 2*	**10**
		b)	Compare and contrast File system and IOCS	***CO** 2*	*PO 2*	**10**
			OR			
	10	a)	Consider the program shown in the figure, what is the role of IOCS in processing this file.  *Source program*	***CO** 2*	*PO2*	**10**
		b)	Differentiate directory and file. Describe the role of a directory structure in a file system	***CO** 2*	*PO2*	**10**

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