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Code No. : 18432 M (A) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) VIII-Semester Makeup Examinations, July-2023

Real Time Systems (PE-VI)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	List out various types of real time systems.	2	1	1	1	1
2.	Write down various types of schedulers present in real time systems.	2	1	1	1	1
3.	How does priority scheduling improve multitask execution?	2	2	2	1	-
4.	State whether the given statement is True/ false with proper justification. "Using EDF scheduling algorithm any given task set can be schedulable"	2	3	2	2	-
5.	How can we avoid the deadlock situation in real time systems?	2	2	3	1	1
6.	Define priority inheritance and priority inversion in a real time systems.	2	1	3	1	1
7.	Differentiate memory management policies that are used in VxWorks.	2	3	4	1	-
8.	Compare Unix and Windows as real time operating system.	2	2	4	1	-
9.	What are the causes of failures in real time system operations?	2	2	5	1	1,2,3
10.	List out different types of faults that occur in real time systems.	2	1	5	1	1,2,3
Part-B (5 × 8 = 40 Marks)						
11. a)	Distinguish the characteristics of periodic and aperiodic real-time tasks?	4	3	1	2	1
b)	Explain briefly the applications of real time systems.	4	1	1	1	1
12. a)	Explain the preemptive scheduling strategies in real time systems	4	2	2	1	-
b)	Check RMA schedulability for the given periodic tasks. $T_i = (e_i, p_i, d_i)$ where e_i, p_i, d_i are given in milliseconds. $T_1 = (20, 100, 100)$, $T_2 = (40, 150, 150)$, $T_3 = (100, 350, 350)$	4	3	2	2,3	-

13. a)	How deadlocks occur in a real time system? Discuss various methods of detection.	4	2	3	2	1																														
b)	Analyze the given task set using Priority Inheritance Protocol and draw the time line execution of task set given in the table below.	4	4	3	2,3	1																														
	<table border="1"> <thead> <tr> <th>Task</th> <th>Arrival Time</th> <th>Execution Time</th> <th>Task Priority</th> <th>Critical Section</th> </tr> </thead> <tbody> <tr> <td>T1</td> <td>7</td> <td>3</td> <td>1</td> <td>1</td> </tr> <tr> <td>T2</td> <td>5</td> <td>3</td> <td>2</td> <td>1</td> </tr> <tr> <td>T3</td> <td>4</td> <td>2</td> <td>3</td> <td>....</td> </tr> <tr> <td>T4</td> <td>2</td> <td>6</td> <td>4</td> <td>3</td> </tr> <tr> <td>T5</td> <td>0</td> <td>6</td> <td>5</td> <td>4</td> </tr> </tbody> </table>	Task	Arrival Time	Execution Time	Task Priority	Critical Section	T1	7	3	1	1	T2	5	3	2	1	T3	4	2	3	T4	2	6	4	3	T5	0	6	5	4					
Task	Arrival Time	Execution Time	Task Priority	Critical Section																																
T1	7	3	1	1																																
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T4	2	6	4	3																																
T5	0	6	5	4																																
14. a)	List out the features of Vxworks operating system and briefly explain them.	4	1	4	1	-																														
b)	Describe the I/O management policies used in real time systems.	4	2	4	1	-																														
15. a)	Evaluate the system design technique for fault tolerant applications of real time systems.	4	4	5	3	1,2,3																														
b)	Design a real time operating system for image processing applications by taking an example case study.	4	4	5	3,4	1,2,3																														
16. a)	Discuss the reference model of real time systems with neat diagram.	4	2	1	1	1																														
b)	Illustrate the role of EDF as a dynamic priority scheduling algorithm for real-time systems.	4	4	2	2	-																														
17.	Answer any <i>two</i> of the following:																																			
a)	Discuss the salient features of preemptive priority schedulers.	4	2	3	1	1																														
b)	Explain the system level functions of μ -COS -II real time operating system.	4	4	4	1	-																														
c)	Explain the application of RTOS for control systems used in Air Traffic control system.	4	4	5	3,4	1,2,3																														

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	40%
iii)	Blooms Taxonomy Level - 3 & 4	40%
