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Code No. : 18432 (A) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) VIII-Semester Main & Backlog Examinations, May-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.	Differentiate between Hard and soft RTS?	2	1	1	1	1
2.	Define the following characteristics of Real time systems a) Concurrency b) Custom Hardware	2	1	1	1	1
3.	Differentiate between Preemptive and Non-Preemptive Scheduling?	2	2	2	1	-
4.	State whether the given statement is TRUE/FALSE with a valid justification? "RM Algorithm is optimal for scheduling access of several hard real time periodic tasks to a certain shared critical resource"	2	3	2	2	-
5.	Define unbounded Priority inversion with a suitable example?	2	1	3	1	1
6.	How a ceil value is assigned to a shared resource in PCP?	2	3	3	2	1
7.	List the function of Memory management unit in RTOS?	2	1	4	1	-
8.	Differentiate between Traditional OS and RTOS?	2	2	4	1	-
9.	What are the causes of occurrence of faults in RTOS?	2	1	5	1	1,2,3
10.	List any two applications of RTOS in the field of VoIP (voice over Internet Protocol)?	2	1	5	1	1,2,3
Part-B (5 × 8 = 40 Marks)						
11. a)	In a hard real time system is it necessary that every task in the system be of hard real time type? Explain your answer with a suitable example?	3	2	1	2	1
b)	What is the necessity of scheduler in RTS explain with a suitable example? Give the classification of schedulers in Real time systems?	5	3	1	2	1
12. a)	Calculate the CPU utilization time (U_i) for $t_1 - T_1(P_1) = 60\text{msec}$ $C_1 = 25$ for $t_2 - T_2(P_2) = 90\text{msec}$ $C_1 = 40$ Draw the timing diagram if Priority of $t_1 > t_2$	3	3	2	1,2	-

Contd... 2

150

b) Interpret whether the given set of periodic real time tasks is schedulable on a Uniprocessor system using RM Algorithm?

Task	Start Time (ms)	Processing Time(ms)	Period (ms)	Deadline (ms)
T1	20	25	150	100
T2	40	7	40	40
T3	60	10	60	50
T4	25	10	30	20

5 3 2 2,3 -

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13. a) Explain the resource grant rule and resource release rule for priority Ceiling protocol?

4 2 3 1 1

b) With a suitable example explain ,how the Priority Inheritance Protocol prevents Unbounded Priority inversion?

4 3 3 1 1

14. a) Define an Interrupt? Explain the process of Interrupt handling in VxWorks RTOS?

4 1 4 1 -

b) Compare the First fit, Best fit, Next fit and Worst fit memory management policies with suitable example?

4 3 4 2,3 -

15. a) "Fault Tolerance is an essential requirement of RTOS employed for safety-critical domains"
Justify the above statement with an example case study?

4 4 5 2 1,2,3

b) Explain how RTOS signifies its importance in ATC(Air Traffic Control)?

4 2 5 1 1,2,3

16. a) Explain the basic model of Real time system with a suitable diagram?

4 2 1 1 1

b) Write a brief note on short comings of EDF and RM Algorithms?

4 2 2 2 -

17. Answer any *two* of the following:

a) Explain how the deadlocks and unbounded priority inversions can be overcome using PCP?

4 3 3 2,3 1

b) Write any four features of μ COS commercial RTOS?

4 2 4 1 -

c) List any two fault tolerant techniques adopted in RTOS and explain them.

4 2 5 2,3 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	38.75%
iii)	Blooms Taxonomy Level - 3 & 4	41.25%
