Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Real Time Systems **Semester: VIII**
Program: B .Tech (CSE)-LLB-Cyber Law **Time 03 hrs.**
Course Code: CSEG 419 **Max. Marks: 100**
Instructions:

SECTION A
Total marks= [5×4=20]

S. No.	**Attempt all question .Each question carry equal marks.**	**Marks**	**CO**
Q 1	Define real time system .What are the characteristics of real time system. Explain with an example.	**4**	**CO1**
Q 2	What are the distinguishing characteristics of periodic, aperiodic, and sporadic real time tasks?	**4**	**CO1**
Q 3	Explain periodic task model? Explain period, execution time and phase periodic tasks.	**4**	**CO5**
Q 4	List out main differences between hard and soft real□time communication supported by a network?	**4**	**CO5**
Q 5	What is real time communications? Why is real time communications important?	**4**	**CO5**

SECTION B
Total marks= [4×10=40]

	Answer the following questions		
Q 6	Why are algorithms, which can satisfactorily schedule real□time tasks on multiprocessors not satisfactory to schedule real□time tasks on distributed systems?	**10**	**CO4**
Q 7	What is RAC? Discuss the effect of resource contention. Give advantages and disadvantages of priority inheritance protocol.	**10**	**CO3**
Q 8	State whether the following statements are TRUE or FALSE. Justify your answer. i) By extending EDF, we can generate optimal scheduling schemes for hard real□ time tasks in multiprocessor computing environments. ii) RMA is optimal for scheduling access of several hard real□time periodic tasks to a certain shared critical resource.	**10**	**CO4**
Q 9	Explain Rate Monotonic Scheduling Algorithms? What are various assumption in this algorithm? Explain Rate Monotonic Scheduling with example. **OR** What is aperiodic task scheduling? Explain assumption and approaches for aperiodic	**10**	**CO2**

	task scheduling.		
	SECTION-C Total marks= [20×2=40]		
	Answer the following questions		
Q 10	Explain the rules of basic priority ceiling protocol .consider the following system of five jobs, schedule the following five jobs with basic priority ceiling protocol Job | r_i | e_i | π_i | Critical section J1 | 7 | 3 | 1 | [Shaded;1] J2 | 5 | 3 | 2 | [Black ;1] J3 | 4 | 2 | 3 | J4 | 2 | 6 | 4 | [Shaded;4[Black;1.5] J5 | 0 | 6 | 5 | [Black;4]	**20**	**CO3**
Q 11	Write short notes on the following i) Absolute deadline Vs Relative deadline ii) Functional parameter of a job iii) Fixed , Jittered ,sporadic release time iv) Fixed priority Vs dynamic Priority scheduling **OR** Consider scheduling three given set of tasks by using the earliest deadline first (EDF),the Rate Monotonic(RM) and the latest deadline first (LDF) algorithms .Their repetition periods, computation times, the first invocation times, and deadlines are defined in table given below. The task are assumed to be Preemptive. Show the timing Diagram of each task by applying the above three policies. Task | Release Time | Execution Time | Period | Deadline T1 | 0 | 0.5 | 2 | 2 T2 | 1 | 2 | 6 | 6 T3 | 3 | 1.8 | 10 | 10	**20**	**CO2**

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Instructions:

SECTION A
Total marks= [5×4=20]

S. No.	**Attempt all question .Each question carry equal marks.**	**Marks**	**CO**
Q 1	What is a real time system? Explain its various components with a suitable block diagram.	**4**	**CO1**
Q 2	What is the difference between a performance constraint and a behavioral constraint in a real□time system?	**4**	**CO1**
Q 3	Explain the important differences between hard, firm and soft real time systems.	**4**	**CO1**
Q 4	List out main differences between offline and online scheduling with examples.	**4**	**CO2**
Q 5	Differentiate between synchronous and asynchronous I/O? Which one is better suited for use in real□time applications?	**4**	**CO5**

SECTION B
Total marks= [4×10=40]

	Answer the following questions		
Q 6	Explain offline and online scheduling and list out main differences between offline and online scheduling with examples.	**10**	**CO2**
Q 7	What is resource access control? Discuss the effect of resource contention. Give advantages and disadvantages of priority inheritance protocol.	**10**	**CO3**
Q 8	Explain basic priority ceiling protocol and priority inheritance protocol in detail?	**10**	**CO3**
Q 9	State whether the following statements are TRUE or FALSE. Justify your answer. i) By extending EDF, we can generate optimal scheduling schemes for hard real□ time tasks in multiprocessor computing environments. ii) RMA is optimal for scheduling access of several hard real□time periodic tasks to a certain shared critical resource. **OR** Why are algorithms, which can satisfactorily schedule real□time tasks on multiprocessors not satisfactory to schedule real□time tasks on distributed systems?	**10**	**CO4**

<table>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">SECTION-C
Total marks= [20×2=40]</td></tr>
<tr><td></td><td>Answer the following questions</td><td></td><td></td></tr>
<tr><td>Q 10</td><td>Write short notes on the following
i) Critical section ,Mutual execution
ii) Fixed priority vs Dynamic priority scheduling
iii) Firm deadline model
iv) Real time work load Vs Real time Scheduling</td><td>20</td><td>CO4</td></tr>
<tr><td>Q 11</td><td>Determine whether the following set of periodic real□time tasks is schedulable on a uniprocessor using RMA.
<table>
<tr><th>Task</th><th>Start time (ms)</th><th>Processing time (ms)</th><th>Period (ms)</th><th>Deadline (ms)</th></tr>
<tr><td>T1</td><td>20</td><td>25</td><td>150</td><td>100</td></tr>
<tr><td>T2</td><td>40</td><td>7</td><td>40</td><td>40</td></tr>
<tr><td>T3</td><td>60</td><td>10</td><td>60</td><td>50</td></tr>
<tr><td>T4</td><td>25</td><td>10</td><td>30</td><td>20</td></tr>
</table>
OR
What is aperiodic task scheduling ?explain assumption an approaches for aperiodic task scheduling .A system have task such as
<table>
<tr><th></th><th>Execution time</th><th>Period</th></tr>
<tr><td>T1</td><td>2</td><td>10</td></tr>
<tr><td>T2</td><td>5</td><td>15</td></tr>
<tr><td>T3</td><td>9</td><td>25</td></tr>
</table>
Show the periodic task T1,T2,T3 are scheduled by the RMA.</td><td>20</td><td>CO5</td></tr>
</table>