PART - A

Answer all questions. Each question carries 4 marks.

1. Explain the advantages of using Linux as Real time OS.  
2. Explain the differences between rate monitoring and deadline monitoring in scheduling.  
3. Explain the limits of current real time systems.  
4. Explain the advantages of a microkernal RTOS over a monolithic OS in supporting real time applications.  
5. Explain the need for guaranteed dynamic priority assignment schemes, for multiple tasks with firm deadlines.  
6. Compare between fixed and dynamic priority assignments to tasks.  
7. Briefly explain the data structures used for the kernel implementation.  
8. List four mechanisms used for communication and synchronization between tasks in RTOS.  
9. Explain priority-based preemptive scheduling used in RTOS.  
10. With an example, explain how can we use semaphore as a synchronization tool.
PART – B

Answer any two questions from each Module. Each question carries 10 marks.

Module – I

11. a) Explain the features of real time kernels. 5
   b) With a neat diagram, explain the address translation mechanism in real time systems. 5

12. a) What is meant by preemptive kernel? Explain. 5
   b) Explain why interrupt and dispatch latency times must be bounded in a hard real time system. 5

13. a) Explain the relation between RTOS and embedded systems. 5
   b) Explain the minimum state transition diagram of a kernel in RTOS. 5

Module – II

14. a) Under what circumstances is rate-monotonic scheduling inferior to earliest deadline first scheduling in meeting the deadline associated with the processes? 6
   b) Explain the differences between threads and processes. 4

15. Check whether the Earliest Deadline Due (EDD) algorithm produces a feasible schedule for the following task set, given that all tasks are synchronous and arrive at time \( t = 0 \). 10

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<td>( D_i )</td>
<td>8</td>
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16. Given are five tasks with arrival times, execution times and deadlines according to the following table.

   a) Determine the Earliest Deadline First (EDF) schedule.
   
   b) Is the schedule feasible?

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Module – III

17. With a neat diagram, explain the architecture of RTOS kernel.

18. List two popular real time operating systems that are commercially available and explain their features.

19. a) Draw the structure of the Task control block and explain different fields.
   b) Briefly explain the time management in kernels.