

**INSTITUTE OF AERONAUTICAL ENGINEERING**

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech VIII SEMESTER END EXAMINATIONS (REGULAR) - JUNE 2022

Regulation: R18

REAL TIME SYSTEMS**Time: 3 Hours****(ECE)****Max Marks: 70**

**Answer FIVE Questions choosing ONE question from each module
(NOTE: Provision is given to answer TWO questions from any ONE module)**

All Questions Carry Equal Marks**All parts of the question must be answered in one place only****MODULE – I**

1. (a) Explain RTOS. Describe the classification of real time systems with examples.
[BL: Understand| CO: 1|Marks: 7]
- (b) What are the different inter process communication? Illustrate task state diagram and explain each task state in detail.
[BL: Apply| CO: 1|Marks: 7]
2. (a) How to handle interrupt source calls in real- time operating systems (RTOS)? Explain the key characteristics and services of RTOS.
[BL: Understand| CO: 1|Marks: 7]
- (b) Explain scheduling mechanism. List out various scheduling algorithms and explain any one scheduling algorithm in detail.
[BL: Understand| CO: 1|Marks: 7]

MODULE – II

3. (a) Write about semaphores. Explain task and resource synchronization using semaphores. Differentiate semaphores and mutex.
[BL: Understand| CO: 5|Marks: 7]
- (b) Enumerate event registers. Illustrate the operation associated with an event register with example.
[BL: Understand| CO: 5|Marks: 7]
4. (a) Discuss the importance of conditional variables in RTOS. Explain the operation associated with the conditional variables
[BL: Understand| CO: 2|Marks: 7]
- (b) Draw and explain the FIFO and priority-based task-waiting lists. Give examples for message queue content.
[BL: Understand| CO: 2|Marks: 7]

MODULE – III

5. (a) Illustrate basic I/O system in real time systems with neat block diagram.
[BL: Understand| CO: 3|Marks: 7]
- (b) Explain in brief about programmable interval timers and timer interrupt services with examples.
[BL: Understand| CO: 3|Marks: 7]
6. (a) Describe dynamic memory allocation and fixed-size memory management with respective similarities and differences.
[BL: Understand| CO: 4|Marks: 7]
- (b) Write about real time clock with diagram. Explain the issues associated with timing wheels in detail with examples.
[BL: Understand| CO: 4|Marks: 7]

MODULE – IV

7. (a) Write a short note on resource classification in real time systems. Describe unbounded priority inversion with example. [BL: Understand| CO: 5|Marks: 7]
(b) Enumerate dead lock condition in task synchronization and explain how it can be prevented. [BL: Understand| CO: 5|Marks: 7].
8. (a) Explain priority inversion method in real time systems with a detailed example. [BL: Understand| CO: 5|Marks: 7]
(b) List and explain various resource synchronization methods in real time systems. [BL: Understand| CO: 5|Marks: 7]

MODULE – V

9. (a) Describe the features of μ COS real time operating system. Explain the role of RTOS in fault tolerant applications. [BL: Understand| CO: 6|Marks: 7]
(b) What are the important features of Vx works for a sophisticated RTOS. Explain the concept of memory layout in Vx works. [BL: Understand| CO: 6|Marks: 7]
10. (a) Illustrate a case study of embedded RTOS for voice over IP. [BL: Understand| CO: 6|Marks: 7]
(b) Explain the significance of RTOS in image processing and control systems applications. [BL: Understand| CO: 6|Marks: 7]

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