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**Eighth Semester B.E. Degree Examination, July/August 2022**  
**Real Time Operating Systems**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

**PART – A**

- 1
  - a. How the software service is driven by an event? Explain with the help of pseudocode outline. (08 Marks)
  - b. Using timeline, explain Real Time Service with hardware acceleration. (07 Marks)
  - c. Design a outline block diagram for distributed continuous media real time service for video pipeline and explain briefly. (05 Marks)
- 2
  - a. What is the largest challenge in real time embedded system and how to overcome the same? Explain worst case response time with equation. (06 Marks)
  - b. With the help of timing diagram, explain :
    - i) Hard Real Time Service Utility
    - ii) ISOchronal Service Utility
    - iii) Anytime Service Utility. (06 Marks)
  - c. Draw the basic service state diagram, which includes programmed delay and suspension along with other state and explain the state transitions. (08 Marks)
- 3
  - a. Explain the algorithms for determination of necessary and sufficient feasibility test with rate monotonic policy. (08 Marks)
  - b. Explain Rate Monotonic Policy with overload scenario. (06 Marks)
  - c. Explain the feasibility test equation proposed by Liu and Layland for preemptive fixed priority policy with an example for 3 service case. (06 Marks)
- 4
  - a. What are the system characteristics which are necessary for computing deterministic execution time for a service? Explain worst case and average case execution time. (06 Marks)
  - b. Explain the five possible overlap conditions for CPU time and output time relative to service deadline. (05 Marks)
  - c. With an example, explain how Hamming syndrome catches and corrects single bit error. (09 Marks)

**PART – B**

- 5
  - a. Explain deadlock and critical section with an example. (06 Marks)
  - b. Discuss the solutions to unbounded priority inversion. (06 Marks)
  - c. Explain handling of missed deadlines and quantifying quality of service in real time system. (08 Marks)
- 6
  - a. Draw the architecture of a device driver interface and discuss RTOS system software mechanisms. (12 Marks)
  - b. Explain : i) Single step debugging ii) Kernel scheduler traces. (08 Marks)
- 7
  - a. Explain some basic methods for building performance monitoring capability into :
    - i) The hardware ii) Firmware and software. (12 Marks)
  - b. What the basic method for optimizing code segments. (08 Marks)
- 8
  - a. What are the Similarities and differences between Reliability and Availability? (08 Marks)
  - b. Explain two phase spiral model for implementing a system. (06 Marks)
  - c. Discuss the implementation of RTOS in PIC18 architecture. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.