POKHARA UNIVERSITY

Level: Bachelor Semester:Fall Year : 2020
Programme: BE Full Marks: 100
Course: Real Time System Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain the characteristics of a Real time System. Differentiate between Hard and Firm Real-time Systems with examples. 8
   b) Explain the common misconceptions of Real Time System with suitable examples. 7
2. a) Compare and contrast Procedural and Structural Real Time design techniques 8
   b) Differentiate between Rate Monotonic Analysis (RMA) and Earliest Deadline First (EDF) scheduling policies for scheduling a set of Real time Tasks. Draw a timeline to schedule two tasks that are released at time 0, task T_1 with an execution time of 1 unit, periodicity of 2 units and task T_2 with an execution time of 2 units, periodicity of 5 units using both RMA and EDF Scheduling policies. 7
3. a) Explain the Fixed Priority Scheduling and Dynamic Priority Scheduling with examples. 8
   b) Compare and contrast Priority Inversion and Priority Ceiling Protocol. 7
4. a) Explain the response time analysis for fixed period systems. 8
   b) What are recovery blocks? How can recovery blocks be used for making a system Fault tolerant? Explain with an example. 7
5. a) How can software simulators and hardware prototypes be used during integration and debugging of Real time, embedded system? 7
   b) What are POSIX timers, how can they be created? What are different types of timers? 8

6. a) Describe memory locking as an important feature provided by commercial real-time kernels. How does this feature differ from swapping technique used by conventional operating systems? 7
   b) Verify the schedulability under RM and construct the schedule of the following task set: 8

τ_i	e_i	ρ_i
τ_1	3	7
τ_2	5	16
τ_3	3	15

7. Write short notes on: **(Any two)** 2×5
   a) Scaled Numbers
   b) Synchronized Polled Loop
   c) CPU Utilization