POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2019
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) Differentiate between a Real time System and a Real time Operating System with examples. What features must a programming language possess to be classified it as a Real time Programming language? 7

   b) What are the common Misconceptions regarding Real time Systems? Explain the Real Time System design issues with suitable example. 8

2. a) Explain the recommendations on specification approach for Real Time System. 7

   b) What do you mean by Real Time Kernel? Explain the Pseudo Kernel with examples. 8

3. a) How do Rate Monotonic Analysis and Earliest Deadline First scheduling policies schedule tasks? 8

   Draw a time line to find out if the following two tasks with the given specifications

Task	Release Time r_i	Execution Time e_i	Periodicity p_i
T_1	0	2	4
T_2	1	3	6

   can be feasibly scheduled according to

   i. Rate Monotonic Analysis (RMA)
   ii. Earliest Deadline First (EDF)

   b) Compare and contrast Data Buffering and Time Relative Buffering with suitable diagram. 7

4. a) Why is proper memory management crucial in Real time Systems? What are various ways of performing efficient Real time memory management? 8

   b) Why should memory utilization be minimized in Real time Systems? Mention various techniques that can used to minimize the memory utilization for performance optimization of Real time Systems. 7

5. a) What do you mean by Variable Selection? A computer system has 59 megabytes of program memory that is loaded at 65%, 30 megabytes of RAM area that is loaded at 18%, and 17 megabytes of stack area that is loaded at 55%. Calculate the total memory utilization. 8

   b) Do you think Real time Systems should be fault tolerant as well? Justify. In what ways fault tolerance provided by N-Version Programming is different from fault tolerance provided by Built-in-test software (BITS) technique? Explain with an example. 7

6. a) Compare and contrast System Unification & System Verification. 7

   b) In a real-time system why is it often desirable to lock the important process's memory down? How can memory locking be done using POSIX APIs? 8

7. Write short notes on: **(Any two)** 2×5

   a) Interrupt driven and Preemptive-Priority System

   b) Binary Angular Measure

   c) Thread Creation Mechanism