

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech 7<sup>th</sup> Semester ECE

COURSE CODE: 19B1WEC731

MAX. MARKS: 35

COURSE NAME: Real-Time Operating Systems

MAX. TIME: 2 Hours

COURSE CREDITS: 03

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Qu-1: Attempt all the following questions. Each carries one mark:

- Give one example of real-time data base.
- What is difference between soft and hard-real-time?
- Why almost all embedded systems are having real-time operating systems?
- What is basic difference between clock driven and table driven scheduling?
- What is centralized and distributed system of clocks in real-time operating system?

(1\*5=5)

- Q-2: a) What do you mean by the fail-safe system? Explain with example. (2)
- b) What do you mean by the safety critical system? Explain with example. (2)
- c) On the basis of timing constraints categorize the behavioral constraint (2)

Q-3: a) Consider the following three real-time tasks to be scheduled using earliest deadline first on a uniprocessor:

$$T_1=(e_1=10; p_1=20), T_2=(e_2=5, p_2=50), T_3=(e_3=10, p_3=3)$$

Determine whether the task is schedulable. (2)

- b) What are shortcoming of earliest deadline first task scheduling? (2)
- c) Explain Unbounded Priority Inversion with example. (2)

- Q-4: a) Explain the priority ceiling protocol (PCP) . What are its merits? (2)
- b) What are different types of priority ceiling protocol (PCP)? (2)
- c) What do you mean by the task dependencies? How these can be handled? (2)

- Q-5: a) What do you mean by the clock synchronization? What are two main approaches of internal clock synchronization? (2)
- b) Explain the working of Byzantine clock? Why these clocks are threat for synchronization? (2)
- c) A distributed real-time system have 10 clocks, it is required their minimum drift to 1 ms. Let the maximum drift be  $5 \times 10^{-8}$ . Determine the required synchronization interval. (2)

- Q-6: a) Explain different types of networks for communication those are used in real-time communication. (2)
- b) Explain in brief QoS real-time communication parameters. (2)
- c) How real-time data base is different from the conventional database (2)

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