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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, December – 2020

(Seventh Semester)

BCSPC 7020 - REAL TIME SYSTEMS**(CSE)**

Time: 2 hrs

Maximum: 50 Marks

The figures in the right hand margin indicate marks.**PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)**

- Q.1. Answer ALL questions** [CO#] [PO#]
- a. Which one of the following is not true for cyclic scheduler? [CO1] [PO1]
 (i) Computationally efficient (ii) Takes very little memory space
 (iii) Tolerant to changing execution time and periods of task (iv) Can be used to schedule tasks with varying periods
- b. Which one of the following tasks can be considered to be a hard real time task? [CO1] [PO1]
 (i) Issue a book using a library management system (ii) Withdraw cash from a bank ATM
 (iii) Planning of the next step by a robot (iv) Saving an opened file by a word processor
- c. Given that two tasks have different phases, which one of the following can be inferred? [CO1] [PO1]
 (i) Some of the instances of the two tasks may arrive exactly at the same time (ii) They have different deadlines
 (iii) They have different execution times (iv) They have different periods
- d. The resources called nonpreemptable or critical resources are [CO2] [PO1]
 (i) files (ii) devices
 (iii) certain data structures (iv) All of the above
- e. Priority ceiling protocol extends the idea of [CO2] [PO1]
 (i) PIP (ii) HLP
 (iii) PIP and HLP (iv) None of the above
- f. The lowest priority task does not suffer any inversions when sharing certain critical resources in [CO3] [PO1]
 (i) PCP (ii) HLP
 (iii) PIP (iv) PIP and HLP
- g. Communication networks expected to provide absolute QoS guarantees to the applications [CO3] [PO1]
 (i) Hard real-time communication networks (ii) Soft real-time communication networks
 (iii) All of the above (iv) None of the above
- h. Conventional 2PL is unsatisfactory for real-time applications for [CO4] [PO1]
 (i) possibility of priority inversions (ii) long blocking delays
 (iii) deadlock (iv) All of the above
- i. In real time operating system [CO4] [PO1]
 (i) kernel is not required (ii) all processes have the same priority
 (iii) process scheduling can be done only once (iv) a task must be serviced by its deadline period
- j. For real time operating systems, interrupt latency should be [CO4] [PO1]
 (i) minimal (ii) maximum
 (iii) zero (iv) dependent on the scheduling

PART – B: (Short Answer Questions)**(2 x 5 = 10 Marks)**Q.2. Answer ALL questions

- | | [CO#] | [PO#] |
|--|-------|-------|
| a. State difference between a performance constraint and a behavioural constraint in a real-time system? | [CO1] | [PO2] |
| b. Whether PCP is well suited protocol to share or do not share a set of serially reusable preemptable resources among a set of real-time tasks. Justify | [CO2] | [PO1] |
| c. Can PIP and PCP be considered as greedy algorithms? | [CO2] | [PO2] |
| d. Define two types of traffic scheduling disciplines. | [CO3] | [PO1] |
| e. Commercial real-time operating systems such as PSOS and VRTX will support EDF scheduling of tasks or not. Justify | [CO4] | [PO2] |

PART – C: (Long Answer Questions)**(6 x 5 = 30 Marks)**Answer ANY FIVE questions

- | | Marks | [CO#] | [PO#] |
|---|-------|-------|-------|
| 3. Using a block diagram show the important hardware components of a real-time system and their interactions. Explain the roles of the different components. | (6) | [CO1] | [PO2] |
| 4. Check whether the following set of periodical real time task is schedulable under RMA on a uniprocessor: $T_1 = (e_1=20, p_1=100)$, $T_2 = (e_2=30, p_2=150)$, $T_3 = (e_3=60, p_3=200)$. | (6) | [CO1] | [PO2] |
| 5. Explain Priority Inheritance protocol with an example and state its disadvantages | (6) | [CO2] | [PO2] |
| 6. Explain the approaches of internal synchronization | (6) | [CO2] | [PO2] |
| 7. Explain the three types of network relevant to real time communication | (6) | [CO3] | [PO2] |
| 8. Explain two utilization-based metrics for comparing the performance of different protocols | (6) | [CO3] | [PO2] |
| 9. Explain POSIX, source standards and real time POSIX standard | (6) | [CO4] | [PO3] |
| 10. If you want to select computers for some embedded real-time application, identify and explain the parameters that are important for real time applications | (6) | [CO4] | [PO3] |

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