Total pages: 02

PG (CBCS)
M.Sc. Semester-I Examination, 2022
COMPUTER SCIENCE
PAPER: COS 104
(REAL TIME SYSTEM)

Full Marks: 40   **Time: 2 Hours**

GROUP-A

1. **Answer any FOUR of the following questions:**   4×2=8

   a) What is Real time System? Give an example?
   b) What is Dead-Line?
   c) What is Hard & Soft real time system?
   d) What is POSIX?
   e) Different between Effective-Deadline-First (EDF) & Least-Slack-Time First (LST)?
   f) What is Clock Driven approach?
   g) Give and explain an example of stimulus response deadline.
   h) What do you understand by chain blocking?

GROUP-B

2. **Answer any FOUR of the following questions:**   4×4=16

   a) Describe the Model of Real Time Communication?
   b) Explain using appropriate example as to why a critical resource can get corrupted if the task using it is pre-empted, and another task is granted use of resource.
   c) Discuss the deficiencies of Windows as Real-Time OS.
   d) Explain Precedence Constraints and Data Dependency?
   e) Write use of Priority-Ceiling Protocol in Dynamic Priority Systems?
   f) Define Resource Access Protocol (RAC)? With example?
   g) Explain Aperiodic and Sporadic jobs in Priority Driven approach?
   h) Consider the following set of four independent real time periodic task.

Task	Start Time (nSec)	Process Time (nSEC)	Period (nSec)
T1	20	25	150
T2	40	10	50
T3	20	15	50
T4	60	50	200

## GROUP-C

3. Answer any <u>TWO</u> of the following questions: **2×8=16**

    a) Difference between Priority-Based Service and Weighted Round-Robin Service? What is Stack Based Priority? What are uses of Commercial Real Time databases?

    b) What is offline and online scheduling? Define temporal Consistency? Write four Features of RTOS?

    c) A set of hard real time periodic tasks need to be scheduled on a uniprocessor using RAM. The following table contains the details of these periodic tasks and their use of three non-pre-emptive shared resources. Can the tasks T2 and T3 meet their respective deadlines when priority ceiling protocol (PCP) is used for resources scheduling?

Task	p_i	e_i	R_1	R_2	R_3
T1	400	30	15	20	-
T2	200	25	-	20	10
T3	300	40	-	-	-
T4	250	35	10	10	10
T5	450	50	-	-	5
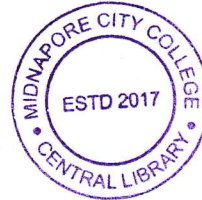
        p_i indicates the period of the task T_i and e_i indicates its computation time. The period of each task is the same as deadline. The entries in the Ri columns indicate the time duration for which a task need the named resource in non-pre-emptive mode. Assume that after a task releases a resource, it does not acquire the same or any other resource.

    d) Real time tasks are normally classified into periodic aperiodic and sporadic real time tasks.

       i. What are the basic criteria based on which a real time task can be determined to belong to one of the three categories.

      ii. Mention some unique characteristic of each of the three categories of task.

     iii. Give example of task in real system which belong to each of the three categories.

*****