Registration No.:_____

PNR No:: 117182DCA497750

COURSE CODE : DCAP608

COURSE NAME : REAL TIME SYSTEMS

Time Allowed: 03:00 hrs ***Max.Marks: 80***

1. This question paper is divided into two parts A and B.
2. Answer all the questions in serial order.
3. Part A contains 10 questions of 2 marks each. All questions are compulsory.
4. Part B contains 10 questions (Questions 2 to 11) of 10 marks each, attempt any 06 questions out of 10. Attempt all parts of the selected question. Only first 06 attempted questions would be evaluated.
5. The student is required to attempt the question paper in English medium only.
6. Simple non programmable calculator is allowed.

PART A

Q1(a) Which type of real time system use in aircraft?

(b) Algorithm ITR terminates after a finite number of iterations. Prove it.

(c) Define release-time jitter.

(d) Define functional parameter.

(e) What do you understand by Round-robin approach? Describe it.

(f) Differentiate between EDF and the LST Algorithms.

(g) What are the roles of frames and major cycles?

(h) What is the maximum flow and feasible preemptive schedule?

(i) A deferrable server with period 4 and budget 1 is added. Can the system be scheduled?

(j) Explain fixed-priority systems.

PART B

Q2 What are the real-time command and controls?
Q3 A system uses the cyclic EDF algorithm to schedule sporadic jobs. The cyclic schedule of periodic tasks in the system uses a frame size of 5, and a major cycle contains 6 frames. Suppose that the initial amounts of slack time in the frames are 1, 0.5, 0.5, 0.5, 1, and 1.
(a) Suppose that a sporadic job S1 (23, 1) arrives in frame 1, sporadic jobs S2 (16, 0.8) and S3 (20, 0.5) arrive in frame 2. In which frame are the accepted sporadic jobs scheduled?
(b) Suppose that an aperiodic job with execution time 3 arrives at time 1. When will it be completed, if the system does not do slack stealing?
Q4 Discuss the temporal parameters of real-time workload.
Q5 Consider a system that has two processors and uses an on-line preemptive scheduler to schedule jobs on the processors. At time 0, three independent jobs, Jl, J2, and J3, with execution time 1, 1, and 2, respectively, are released. Their deadlines are 2, 2, and 4, respectively. The scheduler either schedules a portion of J3 before time 1, or it does not schedule J3 before time 1. We now consider these two cases. a) In case (1), the scheduler schedules a portion of J3 before time 1. Now suppose that two more independent jobs, J4 and J5, are released at time 2. Their execution times are both equal to 1,and their deadline are equal to 2. Show that in this case, the schedule can no longer feasibly schedule all the jobs, while a clairvoyant schedule, which foresees the releases of J4 and J5 would not schedule any part of J3 before time 1 and therefore could feasibly schedule all the jobs. b) In case (2), the on-line schedule does not schedule any portion of J3 before time 1. Show by constructing an example that there exist future jobs which the on-line schedule will not be able to schedule

feasibly, while the jobs could feasibly be schedule if the on-line schedule had schedule J3 before time 1.

Q6 Differentiate static and dynamic approach in detail.

Q7 Explain schedulable utilization of the RM Algorithm for Multi-frame Tasks.

Q8 Describe Notations and Assumptions in detail.

Q9 Explain all the parameters of resources.

Q10 Differentiate Hard and Soft Real-Time Systems.

Q11 Describe the Optimality of RM and DM Algorithm in detail.

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