EX/PG/MESEEVE/T/121A/2018

ME in Software Engg (6 Sem) 1st Year 2nd Sem Exam 2018

REAL TIME AND EMBEDDED SYSTEM

TIME: 3 Hours FULL MARKS: 100

Answer Any **FIVE** Questions

1.a) Give 2 examples for each of the following systems:-
i) Real Time Embedded System ii) Real Time Systems (but not Embedded)
iii) Embedded System (but not Real Time)

b) Write down your understanding about following types of systems:-
i) Hard Real Time Systems with Dynamic Characteristics ii) Soft Real Time System with Static Characteristics iii) Periodic Hard Real Time System with Multi-rate characteristics iv) Aperiodic Soft Real Time System with Bounded Arrival Interval Characteristics

c) "Metrics for Real-Time Systems differ from that for Time-Sharing Systems" – Elaborate.

d) While designing a Real Time System, the Designer has to deal with the various types of Requirements that may affect the Design Choice. Please list down all those Requirements. (4+8+4+4)

2.a) Prepare a Table which will do the Features Comparison among various types of memory available for a Real Time Embedded Systems.

b) With proper diagram, elaborate the scenarios regarding how interrupts are connected between Peripherals and Microprocessors.

c) With regard to the DMA transfer, using proper diagram, explain the differences between Burst Mode Transfer and Cycle Mode Transfer.

d) With proper diagram, explain the operation of a Watchdog Timer. (5+6+5+4)

3.a) Write down the factors on which 'Interrupt Latency' depends.

b) Elaborate different types of Software Architecture which can be the alternative to an RTOS.

c) Explain two reasons why one will choose RTOS for a Real Time Embedded System, over no RTOS at all.

d) Explain the criteria based on which one can select a particular RTOS. (5+6+2+7)

4.a) List down different Scheduling Algorithm for a Traditional Operating System and Real Time Operating System

b) Consider a system with three tasks; T1, T2 and T3. These three tasks are periodic tasks with periods 30 ms, 70ms and 100 ms respectively. The execution times of these three tasks are 15 ms, 10ms and 25 ms respectively.

i) Calculate the Total Tasks Utilization.

ii) Whether the system will work properly if the priority assignments are T2>T1>T3. Justify your answer.

iii) Whether the System will work properly using Rate Monotonic Scheduling. Justify your answer.

c) Briefly describe your understanding about Scheduling Point. List down the names of different Scheduling Points. ((2+2)+(2+4+4)+(2+4))

5.a) Explain briefly, why building Embedded Software is different than building traditional software.

b) Using a table, do a comparison between the Linker/Locater of traditional software and that of embedded software.

c) Explain your understanding about the following terminologies:-

i) Debug Monitor

ii) Remote Debugger

iii) Emulator

iv) Simulator (4+4+(3x4))

6.a) Using proper illustration, explain your understanding about Deadlock and Priority Inversion.

b) Using proper illustration, discuss various solutions of the Deadlock problem in an RTOS.

c) Using proper diagram, describe the various hardware components in a Typical Smart Card.

d) List down different types of Smart Card. (6+6+6+2)

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