

Extra

INDIAN INSTITUTE OF TECHNOLOGY

Date: FN/AN, Time: 2 Hrs, Full Marks: 50, Deptt.: E&ECE  
No. Of Students: 75 Mid Autumn Semester Examination  
Sub. No.: EC60503 Sub.. Name: Embedded System Design

Answer all questions

Q1(a) Justify the statement "Embedded systems are tightly constrained systems". [4]  
(b) Differentiate between NRE cost and unit cost of a system. [3]  
(c) How is system specification of an embedded system converted into behavioural specification? Mention the tools and libraries involved in the process. [3]

Q2(a) Explain the term "on-chip debugging" and mention its utility. [3]  
(b) Why is ALE signal an input to the ARM processor? [2]  
(c) "Barrel shifter is a part of B-bus of ALU in ARM." What facility does it provide? [2]  
(d) Explain the advantages and drawbacks of link register in ARM. [3]

Q3(a) Explain the difference between VLIW and SIMD in the context of DSP. [3]  
(b) A program performs some manipulations with numbers 1 to 800. Each number is used exactly once. Individual operations may be addition or subtraction. Final result is stored in an 18-bit register. What should be the size of the extrawide accumulator register to avoid intermediary errors? [5]  
(c) What is meant by DSP core? [2]

Q4(a) What is the address of a USB device when it is just connected to the hub? [2]  
(b) How is plug-and-play policy implemented in USB? [4]  
(c) How does CSMA/CD+AMP take place in CAN? [4]

Q5(a) Perform a round-robin scheduling for the following task set. Compute throughput, average waiting time, average response time for the same. Use time quantum of 2 units. [4]

Process	Burst time
P1	8
P2	10
P3	12

(b) For the following task graph develop a semaphore based synchronization mechanism. Task T3 depends upon completion of T1 and T2. Task T4 depends upon completion of T3 and T5. [3]  
(c) Mention the necessary conditions for deadlock. [3]