Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(ECE-N)/SEM-8/EC-803B/2010

2010

EMBEDDED SYSTEM

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) JTAG stands for

a) Junction transistor added gate

b) Joint test action group

c) Joint test access group

d) none of these.

ii) FPGA configuration is done by

a) Solid-state fuses b) LUTs

c) EEPROMs d) none of these.

iii) Which of the following has largest gate capacity ?

a) SPLD b) CPLD

c) FPGA d) none of these.

iv) For XTAL = 11·0592 MHz, the TH1 value in decimal for baud rate 9600 is

a) – 9 b) – 6

c) – 2 d) 6.

v) What is the organisation of a 4116 DRAM ?

a) 15,000 × 2 bits b) 16,384 × 1 bit

c) 10,000 × 1 bit d) none of these.

vi) A micro-controller normally has which of the following devices on chip ?

a) RAM b) ROM

c) I/O d) All of these.

vii) An architecture used in any microcontroller is

a) Harvard architecture

b) Vonnenman architecture

c) Princepton architecture

d) both (a) and (c).

viii) Which chip has a large number of arrays with each element having fisible links ?

a) GPP b) ASSP

c) FPGA d) Register.

ix) The main function of RTOS is

a) Real time task scheduling and interrupt latency control

b) Process management

c) Device management

d) Memory management.

x) Which is the heart of an embedded system ?

a) Interrupt controller b) Processor

c) I/O devices d) Power supply.

xi) A powerful modelling language which is extensively used in software development process, specially designed for

a) UML b) C

c) JAVA d) SMJ.

xii) Which software tools and modules are used for complex sets of the codes, functions and expressions from the library routines ?

a) Compiler b) Assembler

c) Simulator d) Gross-assembler.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Distinguish between "general purpose OS" and "RTOS".
3. Classify processor according to Flynn's classification. Draw the structure of SIMD. 3 + 2
4. Design an XOR Gate using FPGA and LUT.
5. Describe the classification of ASIC.
6. Describe abstraction and clustering levels of an embedded system.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Discuss the architecture of ARM processor.

b) Explain the operation of Dual slope A/D converter.

c) What do you mean by partitioning ? 5 + 6 + 4

8. a) What is an embedded system ? State the difference between embedded computer system and general purpose computer system.

   b) What are the classifications of embedded system ?

   c) Discuss the system specifications of an embedded system. 2 + 3 + 3 + 7

9. a) Define Discrete Fourier Transform (DFT).

   b) State the convolution theorem of DFT.

   c) Show the interfacing of ADC with 8051 microcontroller.

   d) Determine the z-transform of the signal

   $x(n) = \delta(n+1) + 3\delta(n) + 6\delta(n-3) - \delta(n-4)$.

   3 + 4 + 5 + 3

10. a) What is RTOS ?

    b) Why is it required ?

    c) Describe in brief the structure of RTOS.

    d) What are the utilities of device drivers in an embedded system ? 2 + 2 + 8 + 3

11. a) What is DMAC ? Describe DMAC with the suitable block diagram.

    b) Compare RISC and CISC architectures. What is in circuit test ? 7 + 5 + 3

12. Write short notes on any *three* of the following : 3 × 5

    a) Cache memory and Cache controller.

    b) Sigma Delta type ADC.

    c) Pressure and Temperature sensors.

    d) JTAG

    e) Diffrent types of PLD.

    f) Design of 4-bit ALU and a 4-bit Counter using any Embedded software language.