Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(ECE)/SEP.SUPPLE/SEM-8/EC-803B/2012

2012

EMBEDDED SYSTEMS

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 :

$10 \times 1 = 10$

i) Which of the following processor architectures supports easier instruction pipelining ?

a) Harvard b) Von Neumann

c) Both (a) and (b) d) None of them.

ii) Which of the following is one time programmable memory ?

a) SRAM b) PROM

c) FLASH d) NVRAM.

iii) How many memory cells are present in 1 kb RAM ?

a) 1024 b) 8192

c) 512 d) 4096.

iv) What is the minimum number of interface lines required for implementing I2C ?

a) 1 b) 2

c) 3 d) 4.

v) Which of the following is/are synchronous serial interface ?

a) I2C b) SPI

c) UART d) Only (a) and (b).

vi) Name the register holding the address of the memory location for the next instruction to fetch.

a) DPTR b) PC

c) SP d) None of these.

vii) Name the register holding the address of external data memory to be assessed in 16 bit external data memory operation.

a) DPTR b) PC

c) SP d) None of these.

viii) The design of an integrated circuit with built in ADC is an example for

a) analog b) digital

c) mixed signal d) none of these.

ix) The representation of interconnection among various components of a hardware in 'Layout' is known as

a) footprint b) route/trace

c) layer d) none of these.

x) In embedded hardware design context, a 'VIA' is a

a) conductive drill hole

b) interconnection among components

c) ground line

d) none of these.

xi) The program that converts machine codes into target processor specific assembly code is known as

a) disassembler b) assembler

c) cross-compiler d) simulator.

xii) Which of the following ICs is an example of IC buffer ?

a) 74LS00 b) 74LS244

c) 74LS08 d) 74LS373.

xiii) The number of logic gates present in IC is 500. The integration type of IC is

a) MSI b) LSI

c) SSI d) VLSI.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What are the advantages of DMA based data transfer over the interrupt driven data transfer ?
3. Briefly explain salient features of an embedded system with (a) Harwired control and (b) Micro-program control.
4. Design an EX-OR gate using FPGA and LUT.
5. What is an Embedded System ? State the applications of embedded system.
6. What do you mean by the memory hierarchy in an embedded system ?
7. Calculate the 4-point DFT of the sequence : $x[n] = \{0\ 1\ 0\ 1\}$ and also find the IDFT of the obtained result.
8. With neat block diagram explain Successive Approximation method.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

9. a) Describe the efficiency measuring parameters of an embedded system.

   b) Describe the different components of an embedded system.

   c) Describe the design methodology of an embeded system.

   d) Describe the different types of microphones are used in an embedded system. 2 + 4 + 4 + 5

10. a) What are the different utilities in mail box, pipe and queue in RTOS ?

    b) What are the different management techniques is adopted and why in real time OS ?

    c) What are the different interrupt rules in real time system ? 5 + 5 + 5

11. a) How does a microprocessor differ from a microcontroller ?

    b) What are the specific features of an embedded system processor ?

    c) Compare RISC and CISC architectures.

    d) Now-a-days high performance embedded systems use either an RISC processor or a processor with an RISC core with a code-optimized CISC instruction set. Explain. 2 + 4 + 6 + 3

12. Describe the characteristics of an embedded system. What do you mean by soft real time and hard real time systems ? Give the differences between embedded system and general purpose computer system. 5 + 5 + 5

13. Give the difference between SIMD, MIMD and VLIW architectures. Explain the different computational models in embedded system design. 5 + 10

14. Write short notes on any *three* the following : $3 \times 5 = 15$

a) Device Driver

b) IEEE Single Precision Floating Point Format

c) System on Chip (SoC) Design

d) Integrated Development Environment (IDE)

e) Boot Loader

f) RTOS for Mobile Communication.

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