Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(ECE-N)/SEM-8/EC-803B/2011

2011

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) I^2C bus stands for

a) Intra *IC* connect bus

b) Interface *IC* connect bus

c) Inter *IC* connect bus

d) none of these.

ii) The number of bit of microcontroller in sophisticated embedded system is

a) 8 or 16 b) 16 or 32

c) 32 or 64 d) none of these.

iii) MAC unit is present in which type of processor ?

a) ARM processor b) DSP processor

c) ASIP processor d) none of these.

iv) In distributed embedded controller which type of bus is used ?

a) CAN bus b) I^2C bus

c) USB bus d) none of these.

v) Architecture used in DSP Processor is

a) Van Newman b) Harvard Architecture

c) SIMD d) All of these.

vi) Which one of the following address structures denotes Direct Mapped Cache ?

a) Tag 5; Block 7; word 4

b) Tag 12; word 4

c) Tag 6; Block 6; word 4

d) None of these.

vii) SOC means

a) a single chip that would realize the entire system

b) a system is distributed in different chips

c) a partially filled system within a chip

d) various program modules included within a chip.

viii) Let h be the hit rate, M the miss penalty, C the time to access information in the cache. The average access time experienced by the processor is

a) $tavg = (1 - h) C + (1 - h) M$

b) $tavg = hC + (1 - h) M$

c) $tavg = (1 - h) C + hM$

d) $tavg = hC + hM$.

ix) L1 Cache is made of

a) DRAM b) SRAM

c) Both of these d) None of these.

x) Memory requirement of ARM in Thumb mode is

a) less

b) same

c) more

d) depends on the system.

xi) G-sensor is used to sense

a) temperature b) speed/position

c) light intensity d) none of these.

xii) UART stands for

a) Uniform Access for Receiver & Transmitter

b) Universal Access for Receiver Transmitter

c) Universal Asynchronous Receiver Transmitter

d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. a) Define an embedded system.

b) How does DSP differ from general purpose processor (GPP) ? 2 + 3

3. Explain the need of watchdog timer and reset after the watch time. 5

4. a) What is the difference between Neuman architecture and Harvard architecture ?

b) Whatr do you mean by Memory Hierarchy in an embedded system ? 3 + 2

5. What do you mean by fixed point and floating point arithmetic in connection with embedded system computation ? Discuss with example. 5

6. a) Define the terms 'Transducer' and 'Actuator' in connection with embedded system design.

   b) Distinguish between embedded computing and distributed computing. 3 + 2

GROUP – C

(Long Answer Type Questions)

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

7. a) Compare SRAM and DRAM.

   b) What is the difference between Standard write & late write in SRAM ?

   c) What is meant by Dynamic power loss of SRAM ?

   d) Name and explain, different reading mechanisms of SRAM from the memory with timing diagram.

   3 + 2 + 2 + 8

8. What do you mean by Pipelining ? How is this concept implemented in ARM core processor ? Describe different modes of ARM core. 3 + 4 + 8

9. a) What is Cache Memory ? What is its importance ?

   b) What is Direct map Cache ? Write the problems associated with this.

   c) Explain how does a function is implemented in FPGA using LUT. 3 + 2 + 4 + 2 + 4

10. a) Discuss different characteristics of DSP Processor. Write the names of DSP Processor used for commercial purpose.

   b) What are the advantages of modified Harvard Architecture ? Why is such architecture necessary in DSP Processor ? What is zero overhead looping ?

   c) What is VLIW processing ? 5 + 2 + 3 + 2 + 1 + 2

11. a) What are different utility in mail box, pipe and queue in RTOS ?

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

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

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

a) Device Driver

b) System On Chip (SOC)

c) Different types of PLD

d) Pressure and temperature sensors

e) Architecture of FPGA.