Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/(EEE-NEW)/SEM-6/EEE-604C/2013

2013

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 : $10 \times 1 = 10$

i) I^2C bus stands for

a) intra IC connects bus

b) interface IC connects bus

c) inter IC connects bus

d) none of these.

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

a) 8 or 16 b) 16 or 32

c) 32 or 64 d) none of these.

iii) Architecture used in DSP processor is

a) Von Neumann

b) Harvard architecture

c) SIMD

d) all of these.

iv) UART stands for

a) Uniform Access for Receive & Transmitter

b) Universal Access for Receive & Transmitter

c) Universal Asynchronous Receiver Transmitter

d) none of these.

v) USB stands for

a) Universal serial bus

b) Uniform serial bus

c) Universal service bus

d) none of these.

vi) In Harvard architecture

a) separate address and data buses are used to access program and data memory

b) same address and data buses are used to access program and data memory

c) separate address bus but same data buses are used to access program

d) same address bus but separate data buses are used to access program and data memory.

vii) Sequential execution of program statement pre-stored in memory is the fundamental principle of

a) Von Neumann computing

b) dataflow computing

c) pipelining

d) embedded processors.

viii) Maximum efficiency of pipelined computing can be obtained when the pipe is

a) full

b) empty

c) partially full

d) full in an interleaved manner.

ix) A massage queue is a

a) PIC b) IPC

c) IPS d) None of these.

x) Shared data problem can be removed using

a) Semaphore b) Scheduler

c) Sematophore d) None of these.

xi) Maximum efficiency of pipelined computing can be obtained when the pipe is

a) full

b) empty

c) partially full

d) full in an interleaved manner.

xii) Each task has a/an

a) ID b) Name

c) Pointer 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 timer and watchdog times. $2\frac{1}{2} + 2\frac{1}{2}$

4. What do you means by task ? State and explain task states. 2 + 3

5. What is the difference between Neumann architecture and Harvard architecture ?

6. Describe the design processor (GPP) methodology of an embedded system.

GROUP – C
(Long Answer Type Questions)

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

7. a) Define a system. What is an embedded system ?

   b) Describe the different components of an embedded system.

   c) What are the components of embedded system hardware ?

   d) Describe the different types of embedded system processor chip or core. 3 + 4 + 3 + 5

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

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

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

9. a) Compare CISC and RISC.

   b) What do you mean by pipeline processing ?

   c) Is the SPI a synchronous or asynchronous bus ? Explain in brief SPI bus. 5 + 5 + 5

10. a) What do you mean by Task and Data ?

    b) Explain the term context and context switch.

    c) What is the function of the Task Control Block ?

    5 + 5 + 5

11. a) What do you mean by the term 'semaphore' ?

    b) Explain Binary Semaphore and Counting Semaphore.

    c) What is the difference between Binary Semaphore and Mutex ? 2 + 8 + 5

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

a) UART

b) Compiler and cross compiler

c) Cross Assembler

d) 12C Bus

e) Round Robin Scheduling.