Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/(EE-NEW)/SEM-6/EE-604D/2013

2013
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 × 1 = 10

   i) RTOS is one which

      a) allows flexible scheduling of the system resource to several task

      b) controls task synchronization

      c) it is an operating system for microcontroller

      d) it is an operating system for preemptive scheduling.

   ii) An architecture used in any microcontroller is called

      a) Harvard architecture

      b) Vonneuman architecture

      c) Princeton architecture

      d) both (a) and (c).

iii) Which of the following describes the ROTS design philosophy best ?

a) Maximize the throughput of the system

b) Maximize the processor utilization

c) Maximizing the response time

d) Response within certain stipulated time period.

iv) Which one of the following scheduling algorithms checks the rate of occurrence of the task ?

a) RAM b) EDF

c) Co-operative d) All of these.

v) Cyclic scheduling is best for which of the following tasks ?

a) Aperiodic b) Sporadic

c) Periodic d) None of these.

vi) Which software architecture is the most complex ?

a) Round robin

b) Round robin with interrupt

c) Functional queue scheduling

d) RTOS.

vii) 8051 is ..... bit microcontroller.

a) 16 b) 8

c) 32 d) none of these.

viii) A small scale embedded system is designed with ..... bit microcontroller.

a) 8 b) 16

c) 32 d) 8 or 16.

ix) Automobile engine control system is the example of

a) soft real time b) hard real time

c) both (a) and (b) d) none of these.

x) Which of the following devices is not an embedded system ?

a) Cell phone b) Mainframe

c) Modem d) Automobile.

xi) Real time means

a) actual time

b) time from start of task

c) time measure using system clock of RTOS

d) time that has a fixed unalterable zero reference in which a clock advances at constant interval and which cannot be reloaded.

xii) Object code is

a) input of assembler b) output of assembler

c) intermediate code d) none of these.

GROUP – B
(Short Answer Type Questions)

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

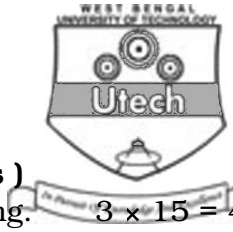
2. Explain Round robin scheduling algorithm in embedded system.

3. What is shared data problem ? Briefly discuss the solution to overcome this problem.

4. What is priority inversion problem ?

5. Describe the design methodology of embedded system.

6. How to initialize USART in synchronous mode ?



GROUP – C
(Long Answer Type Questions)

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

7. What is an embedded system ? What its applications ? What are the components of embedded system hardware ? In how many times can the embedded system be classified ? Describe them. 2 + 2 + 5 + 6

8. a) What is Round robin architecture ?

   b) What are its drawbacks ?

   c) How Round robin with interrupt can solve the problem ?

   d) Why do we need an RTOS in an advanced system ?

   7 + 5 + 3

9. Compare SPI, I^2C, USART stating the possible application areas. How to decide the clock source and the reference voltages for 16F877 AD module operation ? 3 + 3 + 3 + 6

10. What is target system ? What is an emulator ? What are the various components of an emulator ? What are the advantages of using an ICE ? 2 + 3 + 4 + 6

11. a) Explain the functioning of input-output ports fPIC16F877.

    b) What is watchdog timer ?

    c) Discuss the CCP module of PIC16F877. 6 + 2 + 7