Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.Tech/CSE/SEM-8/CS-802B/2013

2013

REAL TIME AND 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)   The ARM conditional execution suffixes provide
        conditional execution by

        a)   checking the state of the relevant flag in the CPSR

        b)   checking the value of the link register

        c)   checking the state of the relevant flag in the SPSR
             for the current processor state

        d)   checking the state of the most significant bit of the
             first operand.

8303   [Turn over
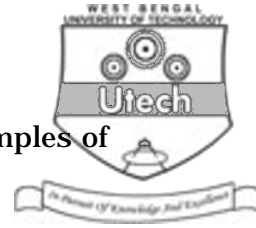
ii) ASCII, EBCDIC and Unicode are examples of

    a) two-state systems

    b) integrated circuits

    c) binary coding schemes

    d) all of these.

iii) *A (n)* ………………… chip provides flexibility and expandability for a computer system; it contains essential information that is required every time the computer system is turned on.

    a) ROM   b) RAM

    c) TCP/IP   d) CMOS.

iv) An embedded system must have

    a) Hard disk

    b) Processor and memory

    c) Operating system

    d) Processor and input-output unit.

v) Sophisticated embedded systems development requires

    a) IPs and serveral ASIPs

    b) IPs and several ASIPs and hardware-software co-design

    c) Multi-core processors

    d) System on chip with large memory.

vi) Unix Operating System is a

    a) Time Sharing Operating System

    b) Multi-user Operating System

    c) Multi-tasking Operating System

    d) All of these.

vii) Real time systems are

    a) primarily used on mainframe computers

    b) used for monitoring events as they occur

    c) used for program development

    d) used for real time interactive users.

viii) Which is a high level abstraction over Semaphore ?

   a)   Shared memory   b)   Message passing

   c)   Monitor   d)   Mutual exclusion.

ix) Identify the category of the following real-time systems as "hard, soft or firm" :

   a)   An on-line celebrity cricket bat auction

   b)   A patient monitoring system in an ICU

   c)   A library book reservation system

   d)   A bank's credit card defaulters notice generation program.

x)   Which of the following describes the RTOS design philiosophy best ?

   a)   Maximize the throughput of the system

   b)   Maximize the processor utilization

   c)   Minimizing the response time

   d)   Response within certain stipulated time period.
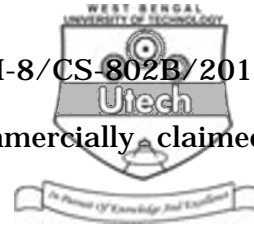
xi) Which of the following is/are commercially claimed RTOSs ?

a) Linux

b) Windows CE

c) mindows NT

d) Vx works.

xii) Which of the following strategies is employed for overcoming the priority inversion problem ?

a) Abandon the notion of priorities altogether

b) Have only two priority levels

c) Allow for temporarily raising the priority of lower level priority process

d) Use pre-emptive policies strictly based on priorities.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. What is a real time system ? Explain its various components with a suitable block diagram.

3. Explain the architectural components used in embedded system.

4. Define the tardiness of the job. How does it affect the soft and hard real time jobs ?

5. What are the main criteria for selecting software for design a real time system ?

6. State the essential steps of Mellor Life Cycle to implement a real time system.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following.   3 × 15 = 45

7. a) Describe the hardware components of an embedded system.

   b) Define ROM image and explain each section of a ROM image in a system.   9 + 6

8. a) What are the goals of real time operating system ?

   b) List three ways in which an ROTS handles the ISR in a multitasking environment. What are the advantages of three-level handling of the interrupts ?   5 + 6 + 4

9. a) What are the advantages of using JAVA for embedded system ?

   b) What are the various embedded system designs modelling Refining ?   6 + 9

10. a) Explain the principle of basic embedded system design using RTOS.

b) What is priority inversion problem ? How it can be solved ?   6 + 9

11. Write short notes on any *two* of the following : $2 \times 7\frac{1}{2}$

   a) DSP

   b) ASSP

   c) SOC

   d) Interrupt latency

   e) Synchronization.

———————