

# EIGHTH SEMESTER B. TECH DEGREE EXAMINATION

2013 scheme

13.803 EMBEDDED SYSTEMS (F)

Time: 3 Hours

Max Marks: 100

## PART –A

*Answer all questions. Each question carries 4 marks.*

1. Compare microprocessors and microcontrollers
2. Explain the role of sensors and actuators in Embedded systems.
3. What is the most important feature in C that makes it a popular high level language for an embedded system?
4. What do you understand by the term “real-time”? How is the concept of real-time different from the traditional notion of time? Explain your answer using a suitable example.
5. How to calculate performance metrics in RTOS? (5 X 4 = 20 marks)

## PART –B

### MODULE –I

6. (a) How are Processor and memory organized in embedded system? (12 mark)  
(b) What is ROM image? Explain the process of converting a ‘C’ program into ROM image? (8 mark)

### OR

7. (a) What is CAN bus? Explain the format of CAN frames? (10 mark)  
(b) Explain the role of interrupt pending register? (10 mark)

### MODULE -II

8. (a) What do you mean by Cross compilers and why do you need it? (10 mark)  
(b) Explain in detail use of modifiers in embedded C programming? (10 mark)

**OR**

9. (a) What are Queues. Explain in detail how queues play a vital role in Network Communication? **(10 mark)**
- (b) Explain the use of function calls in embedded C programming? **(10 mark)**

**MODULE III**

10. (a) Identify the key differences between hard real-time, soft real-time, and firm real-time systems. Give at least one example of real-time tasks corresponding to these three categories. Identify the timing constraints in your tasks and justify why the tasks should be categorized into the categories you have indicated. **(10 mark)**
- (b) Explain Inter Process Communication with an example? **(10 mark)**

**OR**

11. (a) State whether you consider the following statements to be TRUE or FALSE. Justify your answer in each case.
- i. A hard real-time application is made up of only hard real-time tasks.
- ii. It should be the goal of any good real-time operating system to complete every hard real-time task as ahead of its deadline as possible. **(10 mark)**
- (b) If you are asked by your organization to develop software which should be highly reliable, how would you proceed to achieve it? **(10 mark)**

**MODULE IV**

12. (a) Explain the features of real time operating systems and services? **(10 mark)**
- (b) Explain different task scheduling models? **(10 mark)**

**OR**

13. (a) How is interrupt latencies and deadlines handled in real time operating system? **(10 mark)**
- (b) How do we organize file systems in RTOS.? **(10 mark)**