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*Total No of Questions: [12]* *SEAT NO. :* [ ]

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# *B.E. 2008 (Electronics)*

## *Embedded System*

## *(Semester - I)*

*Time: 3 Hours* *Max. Marks : 100*

***Instructions to the candidates:***

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer Q.1 or Q.2, Q.3 or Q.4,Q.5 or Q.6 from section and Q.7 or Q.8,Q.9 or Q.10,Q.11 or Q.12 from Section II.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary***

## SECTION I

Q1) a) Explain characteristics of an Embedded Systems with suitable examples. **[8]**

b) What are the different design metrics used in Embedded System design? What is time to market? Draw and explain simplified revenue model and also calculate the losses if product is delayed by 12 weeks, assuming product life to be 52 weeks? **[8]**

**OR**

Q2) a) Explain message frame format in Controller Area Network (CAN)? **[8]**

b) Explain typical software architectures used in embedded systems. **[8]**

Q3) a) What are various types of processors? Explain internal architecture of a typical processor. **[10]**

b) Why RISC is most preferred choice in Embedded System. **[8]**

**OR**

Q4) a) What is the typical usage of following memory types in Embedded Systems? **[10]**
1) ROM 2) EPROM 3) OTPROM 4) FLASH

b) What is the role of the interrupt in embedded systems? Explain how timings are controlled using Interrupts. **[8]**

Q5) a) Compare and Contrast ARM and Thumb mode of operation. How processor switches between these modes. **[8]**

b) With the help of diagram explain memory organization of LPC 2148. **[8]**

**OR**

Q6) a) With detailed algorithm explain use of on chip ADC of LPC 2148. **[8]**

b) List and explain different operating modes in ARM7 processor. **[8]**

## SECTION II

Q7) a) Write and explain the c code for interfacing of LCD with ARM LPC2148. Display "WELCOME TO UNIVERSITY" message on LCD. **[10]**

b) Explain any one on chip communication protocol of LPC 2148 in detail. **[8]**

**OR**

Q8) a) Write and explain the code for interfacing of 4x4 matrix keyboard with LPC 2148 **[10]**

b) Explain tool chain for programming using embedded C. **[8]**

Q9) a) Explain the concept of context switch. List and explain the different states of the task. **[8]**

b) Explain with suitable examples how semaphores are used to solve share data problem. What are the different variants of semaphores? **[8]**

**OR**

Q10) a) What do you understand by the term "clock tick" in RTOS? Explain the time management functions in µcos – II **[8]**

b) List the µcos – II features. Explain the data structure of Task Control Block (TCB) in µcos – II **[8]**

Q11) a) Explain priority inheritance concept in RTOS with suitable example. **[8]**

b) With suitable example, explain how queues / message mailboxes can be used in inter process communications **[8]**

**OR**

Q12) a) Explain the various kernel objects for inter task communication in µcos – II **[8]**

b) Explain priority inversion with proper timing diagram. Also explain PIP and PCP methods with example. **[8]**