Seventh Semester B.Tech. Degree Examination, November 2017
(2013 Scheme)
13.706.3 : EMBEDDED SYSTEMS (AT)
(Elective – IV)

Time : 3 Hours
Max. Marks : 100

PART – A

Answer all questions. Each question carries 2 marks.

1. Discuss three figures of merits that an RTOS needs which is not important for general purpose OSes.

2. What is hardware software co-design ? Elaborate discuss the ‘Inter process communication’ techniques used in any OS.

3. What is meant by pipes ? Distinguish between named and anonymous pipes.

4. What is the importance of program optimization ?

5. What is the difference between a watch point and a break point ?

6. What is the concept involved in ISP (In System Programming) ?

7. Why is DRAM preferred as the memory type to be used as RAM for PCs ?

8. How exceptions are handled in an embedded system ?

9. What is the use of a Real Time Clock in embedded systems ?

10. Why program optimization is required while designing an embedded system ?

P.T.O.
PART - B

Answer **one full** question from each Module (20 marks each):

**Module – I**

11. a) Describe the basic constituents of an embedded system.  
    b) Describe two applications of embedded system design—one in the automotive field and one in the industrial field.  
    c) Draw the architectural block diagram of a PIC processor and explain its features and register structure.  

    OR

12. a) Draw the architectural block diagram of an ARM processor and explain its register structure and modes.  
    b) Describe with the help of a diagram, an embedded system design for sensing the temperature and humidity of a room. There should be a display and an alarm for the system.

**Module – II**

13. a) Discuss the following memory technologies and their differences in terms of speed an applications  
    i) DRAM  
    ii) SRAM  
    iii) EEPROM  
    b) What is flash ROM? What are its applications?  

    OR

14. a) Discuss the concept of interrupts with the following points in consideration.  
    i) What are the steps involved in processing interrupts?  
    ii) What do the terms interrupt vector, interrupt service routine and nested interrupts mean?  

    b) i) What is the necessity for DMA in embedded systems?  
    ii) How is direct memory access realized using DMA controllers?
Module – III

15. a) What is meant by the term ‘task synchronization’ in the context of operating systems?
   b) What are the aspects that relate to this term? Elaborate this with respect to the various techniques used to ensure synchronization.

OR

16. a) What is the relevance of memory management and discuss the techniques used in this?
   b) Describe the life cycle of a task. Use a diagram to explain the states of a task.
   c) Explain the concepts of mailboxes and sockets in the context of inter process communications.

Module – IV

17. Show the detailed design of a burglar alarm for a multi storeyed apartment. The processor chosen the sensors and actuators, the hardware diagram and flow chart for the software must be included in the design.

OR

18. a) Distinguish between software simulation and hardware debugging. Mention the uses and shortcomings of each.
   b) Describe the necessary elements in an embedded system test set-up. with the aid of an example, outline a strategy for testing embedded software on a host system.

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Library Reference

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