P1481   **[3764]-245**

B.E. (Electronics)
EMBEDDED SYSTEMS DESIGN
(404205) (2003 Course)

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

Instructions to candidates :

1) *Answer three questions from each section.*

2) *Answers to the two sections should be written in separate books.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Figures to the right indicate full marks.*

5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a)   What is an embedded system? How it differs from a general purpose computing system?   [4]

b)   What are the special considerations in designing embedded systems.[6]

c)   Explain MODBUS message structure and device addressing.   [8]

OR

Q2) a)   For a particular product the NRE cost and unit cost for three IC technologies are as follows:

FPGA (Rs. 10,000, Rs. 50); ASIC (Rs. 50,000, Rs. 10) and VLSI (Rs. 2,00,000, Rs. 5).

Determine precise volumes for which each technology yields the lowest total cost.   [10]

b)   Explain time-to-market design metric.   [4]

c)   Explain the MAC protocol used in IEEE 802.11.   [4]

Q3) a)   What are the different categories of embedded operating systems? [3]

b)   Explain the architecture of digital signal processor.   [8]

c)   Explain the term interrupt latency with suitable example.   [5]

OR

Q4) a) Explain TCP / IP protocol suite. [10]

b) Explain the hardware architecture of an embedded system. [6]

Q5) a) Explain pre-emptive and non-pre-emptive multitasking. [8]

b) Explain different productivity tools for developing software systematically. [8]

OR

Q6) a) Explain the process of creating MIDLet. [4]

b) What is code optimization? Explain some important code optimization guidelines. [4]

c) Explain round robin scheduling with interrupts with suitable pseudo code. [8]

SECTION - II

Q7) a) What is the difference between semaphore and mutex? [4]

b) With suitable example explain deadlock during multitasking. [4]

c) Explain the use of mailbox, message ques, pipes, and event registers.[10]

OR

Q8) a) How interrupt requests are served in RTOS environment. [10]

b) Explain the use of semaphores to solve the problem of shared data. [8]

Q9) a) Explain the waterfall model of development of embedded system? [10]

b) List important features of VxWorks. [6]

OR

*Q10)*a) Explain the requirement engineering phase of embedded system development. [8]

b) Explain the semaphore related functions of MUCOS. [4]

c) Explain the timer related functions of VxWorks. [4]

*Q11)*a) With the help of flowchart explain the functioning of digital camera.[10]

b) Explain the basic features of smart card. [6]

OR

*Q12)*a) Explain the functioning of RFID system with suitable block diagram. What are the frequency bands used in RFID systems? **[10]**

b) Explain an embedded system for an adaptive cruise control system in a car. **[6]**