Q. P. Code : 23701

(3 Hours)   [Total Marks : 80

N.B.   1. Question No 1 is compulsory.

2. Solve any **three** questions out of remaining five questions.

3. Assume suitable data if necessary.

4. Figures to right indicate marks.

Q. 1. Solve any **four** out of five.   (20)

1. a. What are the design metrics of Embedded Systems?
    b. Describe the instructions of 8051 , JNC and MUL with one example.
    c. 8051 microcontroller with XTAL frequency = 11.0592 MHz. Find the TH value needed to have the following baud rates of 9600.
    d. Describe the feature of ARM that makes it suitable for embedded system.
    e. What is semaphore? Explain the use of semaphore with respect to embedded operating systems.

Q. 2. a) Discuss Smart Card Reader System in detail.   (10)

b) Illustrate scheduling algorithms of tasks in real time systems   (10)

Q. 3. a) Explain multiple register load and store instructions of ARM7 processor.   (10)

b) Write assembly language program to generate a rectangular waveform of frequency 1KHz and 50% duty cycle at pin P1.7 using 8051. Assume 8051 operating frequency 12MHz.   (10)

Q. 4. a) Write assembly language program for 8051 microcontroller to transfer message "ARM7" serially at baud rate of 2400 in mode 1.   (10)

b) Explain with one example each, the addressing modes of 8051 microcontroller.   (10)

Q. 5. a) Define and classify the embedded systems also list major application areas of embedded systems.   (10)

b) Give details of Barrel Shifter of ARM7 processor and the various operations carried out by the same.   (10)

Q. 6. a) List functions of Kernel. Also explain different types of kernel.   (10)

b) Explain interrupt structure of 8051 microcontroller in detail.   (10)