Roll No. ..... **Total Pages : 03**

BT-7/M-20 **37132**

MICROCONTROLLERS AND EMBEDDED SYSTEM DESIGN

ECE-401N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. What is an embedded system ? Explain function of various embedded processors, microprocessors, microcontrollers and coprocessors used in embedded system in detail with suitable examples. **15**

2. Describe the design process of "Smart Card". What are the software and hardware units required for designing a "Smart Card" ? **15**

Unit II

3. (a) Explain the function of $\overline{EA}$, ALE, $\overline{PSEN}$, RST pins. **8**

(b) Explain, how SP is modifed, using PUSH and POP operation with suitable example. **7**

4. Discuss, how timer works. Also explain its operating modes and associated registers. **15**

Unit III

5. Describe the need and uses of interrupts. Also explain the interrupt execution process along with its associated control registers. **15**

6. (a) Explain, how pipelining works in PIC16C7X microcontrollers with suitable example. **8**

(b) Find the time delay generated by the following instruction. Assume crystal frequency is 12 MHz.

```
        MOV  R0, #20
THERE : MOV  R1, #250
HERE :  DJNZ R1, HERE
        DJNZ R0, THERE
```

7

Unit IV

7. Describe interfacing of 16 × 2 LCD module with the 8051 and develop a program to display "WELCOME" at the beginning of the first line. **15**

8. Explain the operation, programming and interfacing of DC motor with 8051. **15**

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