

**B. Tech 6th Semester Examination**  
**Microcontroller and Embedded Systems (NS)**  
**EC-321**

**Time : 3 Hours**

**Max. Marks : 100**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Attempt five questions in all selecting one question each from sections A, B, C and D. Section - E is compulsory.

**SECTION - A**

1. (a) Draw and explain the functional block diagram of microcontroller. (10)
- (b) Explain the memory organization in 8051 with neat diagram. (10)
2. (a) Explain the interrupts of 8051 microcontroller, indicate their vector addresses. (10)
- (b) Explain power saving options and modes of 8051 microcontroller. (10)

**SECTION - B**

3. (a) Write the addressing modes that are used to access the data. Explain them in detail. (10)
- (b) Write an assembly language program to monitor P1.6. When it becomes 0, accept 8 bit data from port 0 and send it to port 2. Also exclusive OR the data with 0F0H and store result in 50H of RAM. (5)

[P.T.O.]

- (c) Draw the bit format of IE register. Explain the function of each register. (5)
4. (a) Explain the interfacing of stepper motor with 8051. Write an assembly language program to generate a rectangular waveform. (10)
- (b) Explain the following instructions and classify according to the addressing mode used:
  - (i) ORL add, #n
  - (ii) INC 50H
  - (iii) ANLA, #30H
  - (iv) MOV @R<sub>1</sub>, A
  - (v) CPLA (10)

**SECTION - C**

5. (a) What is the basic difference between 8051 microcontroller and 89C51 microcontroller? Give the pin configuration of 89C2051. (10)
- (b) What are the various features supported by 8-bit Pico blaze microcontroller core? Draw the block diagram of 8-bit Pico blaze microcontroller (10)
6. (a) Explain Xilinx FPGA architectures. Discuss input/output blocks, configuration logic blocks and interconnections. (15)
- (b) Differentiate between FPGA and ASICs. (5)

**SECTION - D**

7. (a) Explain in detail various functional building blocks of embedded system. (10)

- (b) Explain the operation of interrupt controller in embedded system. (10)

8. Explain the following:

- (a) Multi thread programming.
- (b) Serial port device driver.
- (c) Software timer unit.
- (d) Cache memory mapping technique. (5×4=20)

### SECTION - E

9. (a) Describe PSW register and its flag bits.
- (b) What is the address stored in stack pointer and program counter after 8051 is reset?
- (c) Define Emulator.
- (d) Which address of internal RAM is used for bit addressing?
- (e) Explain TMOD and TCON of 8051 microcontroller.
- (f) Specify the timer and its mode of operation to carry out serial communication.
- (g) What is the capacity of on chip RAM and ROM of 8051?
- (h) What is the difference between long jump(LJMP) and short jump?
- (i) List the total number of lines used in parallel ports and serial port of 8051.
- (j) Why an embedded processor preferred over a microprocessor or microcontroller. (2×10=20)