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17CS44

## Fourth Semester B.E. Degree Examination, Jan./Feb.2021 Microprocessor & Microcontroller

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. With a neat diagram, explain the working of a 8086 microprocessor. (10 Marks)  
 b. Explain the following 5 addressing modes of 8086 microprocessor:  
     (i) Register addressing mode.  
     (ii) Direct addressing mode.  
     (iii) Register indirect addressing mode.  
     (iv) Base relative addressing mode.  
     (v) Based indexed addressing mode.  
 with example for each. (10 Marks)

### OR

- 2 a. Write an assembly language program to add 5 numbers present in the datasegment. (06 Marks)  
 b. Explain the following 4 assembler directives of 8086 :  
     (i) dup                      (ii) DD                      (iii) EQU                      (iv) ORG  
 with syntax and examples. (08 Marks)  
 c. Explain all bits of a 8086 flag register. (06 Marks)

### Module-2

- 3 a. Explain the interrupt mechanism in 8086 microprocessor. (08 Marks)  
 b. Explain use of these instructions with syntax (i) DAA (ii) MUL (iii) ROR (iv) DIV. (08 Marks)  
 c. Explain the NMI interrupt. (04 Marks)

### OR

- 4 a. Write an ALP to read a string of maximum length of 50 bytes and clear the screen and display the read string at location 12H, 28H on the monitor. (10 Marks)  
 b. Explain the following instructions with its syntax:  
     (i) CMP                      (ii) DAS                      (iii) CALL                      (iv) XCHG                      (v) SAR (10 Marks)

### Module-3

- 5 a. Interface 4, 32 K RAM to 8086 microprocessor. You may choose the address range of your own. Show the memory map. (10 Marks)  
 b. Explain the following string instructions:  
     (i) CMPSB                      (ii) SCASB                      (iii) LODSB                      (iv) MOVSB (10 Marks)  
     (v) STOSB

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



**OR**

- 6 a. Interface 8086 with 8255 chip such that Port A is output port and Port B is input port. Let the addresses be 1100h, 1101h, 1102h, 1103h for Port A, Port B, Port C and control register respectively. Write a program to read from Port B and write it to Port A. (10 Marks)
- b. Explain the following instructions:
  - (i) IDIV      (ii) IMVL      (iii) CBW      (iv) XLAT      (10 Marks)

**Module-4**

- 7 a. Explain RISC design philosophy. (08 Marks)
- b. Explain the instruction set for embedded systems. (06 Marks)
- c. Explain the embedded system hardware. (06 Marks)

**OR**

- 8 a. Explain the data flow model of a typical ARM core. (08 Marks)
- b. Explain the registers in a ARM microcontroller. (08 Marks)
- c. What is CPSR? Explain. (04 Marks)

**Module-5**

- 9 a. Explain the role of barrel shifter in ARM processors. (06 Marks)
- b. Explain the following instructions:
  - (i) RSC      (ii) SBC      (iii) EOR      (iv) AND      (08 Marks)
- c. Explain the MLA and SMLAL instructions with example. (06 Marks)

**OR**

- 10 a. Write a program to copy a block of memory to another area in the memory. (10 Marks)
- b. Explain the following instruction with syntax:
  - (i) STMED      (ii) SWP      (iii) SWI      (iv) CMP      (10 Marks)

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