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## Fourth Semester B.E. Degree Examination, June/July 2019 Microprocessors and Microcontrollers

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. With a neat diagram, explain the internal block of 8088/8086 CPU. (10 Marks)  
 b. Find errors if there are any and correct the same :  
 (i) MOV AL, 1239H      (ii) PUSH BL      (iii) MOV 12H, BL  
 (iv) ADD 15H, 13H      (v) MUL AX, BX      (vi) ROL AX, 06H (06 Marks)

**OR**

- 2 a. Define addressing modes. List and explain various addressing modes present in the 8086 microprocessor. (08 Marks)  
 b. Assume that DS = 4500, SS = 2000, BX = 2100, SI = 1486, DI = 8500, BP = 7814 and AX = 2512.  
 All the values are in HEX. Show the exact physical memory location where AX is stored in each of the following :  
 (i) MOV [BX]+20, AX      (ii) MOV [SI]+10, AX  
 (iii) MOV [DI]+4, AX      (iv) MOV [BP]+12, AX (08 Marks)

### Module-2

- 3 a. Write an Assembly Language Program (ALP) to calculate the total sum of 6 bytes of data. The decimal data is as follows: 125, 235, 197, 91, 100 and 48. Write suitable comments. (06 Marks)  
 b. Explain the following instructions with suitable examples.  
 (i) DAA      (ii) RCR      (iii) RCL      (iv) MUL (10 Marks)

**OR**

- 4 a. Write an assembly language program to convert lower case to upper case for the following sentence. "i aM pROud KanNaDIGA". Use suitable comments. (06 Marks)  
 b. Explain the following :  
 (i) INT 10H function 06H  
 (ii) INT 10H function 02H  
 (iii) INT 21H function 09H  
 (iv) INT 21H function 01H  
 (v) INT 21H function 02H (10 Marks)

### Module-3

- 5 a. Show how the computer would represent the following bytes of data:  
 (i) -5      (ii) -7      (iii) -34H      (iv) -128<sub>(10)</sub> (06 Marks)  
 b. Explain the following with suitable examples:  
 (i) XLAT      (ii) SCANB (05 Marks)

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.



- c. Assuming that there is spelling of "VISVESVARAYA" in an electronic dictionary and a student type "VISHVESVARAYYA". Write an Assembly Language Program that compares these two and display the following messages depending on the result.
- (i) If they are equal "The spelling is correct"
  - (ii) If they are not equal "Wrong spelling".
- (05 Marks)

**OR**

- 6 a. Explain briefly checksum byte and mention the methods being used to check the data integrity in the following storage types: ROM, DRAM, Hard Disks. (06 Marks)
- b. Write the 8255 control word format of I/O mode. (04 Marks)
- c. Explain IN and OUT instructions with examples. (06 Marks)

**Module-4**

- 7 a. Write the difference between microprocessors and microcontrollers. (04 Marks)
- b. Explain the major design rules to implement the RISC philosophy. (08 Marks)
- c. Write a short note on software abstraction layers executing on hardware. (04 Marks)

**OR**

- 8 a. With a neat diagram, explain registers available in ARM in user mode among with generic program status Register. (06 Marks)
- b. What is pipeline in ARM? Illustrate with an example. Show the pipeline stages of ARM7, ARM9 and ARM10. (10 Marks)

**Module-5**

- 9 a. Explain MOVE instructions in ARM with suitable examples. (08 Marks)
- b. Explain the following with examples:
- (i) MLA (ii) QADD
  - (iii) SMULL (iv) LSL
- (08 Marks)

**OR**

- 10 a. Write the arithmetic instructions of ARM. (06 Marks)
- b. Write the register transfer instructions of ARM (04 Marks)
- c. Explain with example forward and backward branch in ARM. (06 Marks)

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