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Fourth Semester B.E. Degree Examination, June/July 2016
Microprocessors

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. What is a microprocessor? Explain how data, address and control busses interconnect various system components. (05 Marks)
- b. Explain in detail with a neat diagram, the working of the internal architecture of the 8086 microprocessor. (10 Marks)
- c. Giving the format of the 8086 microprocessor's flag register, explain in detail each flag bit. (05 Marks)
- 2 a. Explain the following addressing modes with examples :
i) Direct addressing
ii) Immediate addressing
iii) Register indirect addressing
iv) Base plus index addressing
v) Base relative plus index addressing. (10 Marks)
- b. Explain how virtual address is translated into physical address in 8086 microprocessor. Given : CS = 2000h, DS = 4000h, ES = 6000h, SS = 8000h, BX = 300h, BP = 200h, SI = 100h and LIST = 0014h
Find the physical address for the following :
i) MOV DL, LIST[SI]
ii) MOV AL, LIST[BX] [SI]
iii) MOV AH, CS : [BX]
iv) MOV CL, 23h [BP]. (06 Marks)
- c. Explain the working of PUSH and POP instructions indicating the state of the stack after the execution of the instructions. (04 Marks)
- 3 a. Giving the general machine language instruction format of a MOV instruction, generate the machine code for the following instructions :
i) MOV DL, [DI]
ii) MOV [1000H], DL
iii) MOV [BP], DL
iv) MOV WORD PTR [BX + 1000H], 1234H. (10 Marks)
- b. Write an ALP to sort five 8-bit numbers stored in an array in descending order using bubble sort algorithm. (06 Marks)
- c. Explain the working of XLAT instruction, illustrate its importance using a suitable program. (04 Marks)
- 4 a. Explain the following instructions with examples :
i) DAA ii) RLC iii) AAM iv) MOVSB. (08 Marks)
- b. Write an ALP using 8086 instruction set to count the number of ones in a given 8 – bit number and store the result at a memory location. (07 Marks)
- c. What is a procedure? Explain the sequence of operations that take place when a procedure is CALLED and RETURNED. (05 Marks)

PART – B

- 5 a. Differentiate between :
- Assembler and linker
 - PUBLIC and EXTERN
 - Macros and procedures. (06 Marks)
- b. What are modular programs? Explain. Using the PUBLIC and EXTERN directives write a program in assembly language that reads a string into an array in one module and converts the string to uppercase in another module. (08 Marks)
- c. What is recursion? Explain. Write an ALP to find the factorial of a single digit positive number using recursive procedure. (06 Marks)
- 6 a. Explain the significance of the following pins of an 8086 microprocessor :
- READY
 - $\overline{\text{TEST}}$
 - ALE
 - HOLD. (04 Marks)
- b. With neat timing diagrams explain read bus cycle and write bus cycle. (08 Marks)
- c. With a neat diagram, explain the minimum mode configuration of 8088 microprocessor based computing system. (08 Marks)
- 7 a. Differentiate between memory mapped IO and IO mapped IO. (04 Marks)
- b. What is address decoding? Why is it required? Explain how a 3 – 8 line decoder could be used to interface 64K memory using 8K memory chips. (08 Marks)
- c. Design a memory system to interface $8 \times 8\text{K}$ EPROM and $8 \times 4\text{K}$ SRAM to 8088 microprocessor. Assuming SRAM memory starts from 00000H and EPROM from E0000h. (08 Marks)
- 8 a. Explain the control word format of 8255 PPI in IO mode and BSR mode. Construct control words for the following :
- Port A input, PORT B output and PORT C output ports
 - PORT A bi-directional mode, PORT B output port
 - Set PC1 and reset PC5. (08 Marks)
- b. With a neat block schematic diagram explain the internal architecture of 8254 PIT. (08 Marks)
- c. What is DMA? Why is it required? Explain the basic DMA operation. (04 Marks)
