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S.E. (Mechanical) (Semester- III) (Revised Course 2007-08)
EXAMINATION Nov/Dec 2019
Digital Electronics & Microprocessor Applications

[Duration : Three Hours]

[Total Marks : 100]

Instructions:

- 1) Attempt any 5 questions with at least one question from each module.
- 2) Assume suitable data, if necessary.

MODULE-I

- Q.1
- a) Draw a symbol of NAND gate. Explain the working with truth table. State the application of this logic. 4
 - b) Perform the subtraction of the following numbers using 8-bit 2's complement arithmetic 8
 - i) +46-14
 - ii) +26-75
 - c) Answer the following: 8
 - a) Convert $(172.625)_{10}$ in binary
 - b) Convert $(B9F.AE)_{16}$ to octal
 - c) Write the BCD and Excess-33 code for (2048)
 - d) Write the gray code for $(3A7)_{16}$
- Q.2
- a) Design and draw a full -Subtractor with inputs A,B and Cin. Write its truth table. 6
 - b) Implement the following using Multiplexers: 8
 - i) $F(A,B,C,D) = \sum m(1,3,4,11,12,13,14,15)$
 - ii) $F(x,y,z) = \sum m(0,2,3,5)$
 - c) Obtain the minimal expression for $f = \sum m(1,2,4,6,7)$ and implement it using Universal Gates. 6

MODULE-II

- Q.3
- a) Explain the working of a JK flip-flop with a neat diagram and a truth- table. How does it differ from a RS flip-flop? 8
 - b) Convert a D flip-flop to a JK flip-flop. 4
 - c) What are registers? With a neat diagram, explain the working of a Serial-in, Serial-out Shift Register. 8
- Q.4
- a) Design a Synchronous Modulo-10 up/down counter using T flip-flops. 10
 - b) Design a Synchronous Mod-6 Counter using JK flip-flops. 10

MODULE-III

- Q.5**
- a) Explain how Address/ Data bus is demultiplexed in 8085. Why is demultiplexing required? 6
 - b) Explain the following signals in 8085: 8
 - i) READY ii) RST5.5 iii) S0,S1 iv) HOLD
 - c) Define the following terms: 6
 - i) Assembler ii) Operand iii) Microcontroller
- Q.6**
- a) Differentiate between Memory Mapped and Isolated I/O Mapped interfacing. 6
 - b) A 4Kbyte RAM and a 16Kbyte ROM chips are to be interfaced to 8085. How is the memory map determined? 8
 - c) What is meant by Instruction cycle, Machine cycle and T-states? 6

MODULE-IV

- Q.7**
- a) Explain any 4 Arithmetic Instructions in 8085. How do these instructions affect the flag register? 8
 - b) Explain the working of Stack in 8085. Explain the instructions associated with Pushing and Popping Data from the Stack. 8
 - c) Explain the following instructions in 8085 with an example: 4
 - i) LDA ii) CALL
- Q.8**
- a) Explain any 2 addressing modes in 8085 with an example each. 4
 - b) Write an Assembly language program to Add a series of 10 numbers stored in memory starting from 8000H. Store the Sum in B register and Carry in C Register. 6
 - c) Explain how a 4X4 matrix keyboard can be interfaced with 8085 microprocessor. 10