

B.E. / B.Tech. Instrumentation Engineering (Model Curriculum) Semester-IV  
**IN402M - Digital Circuits and Fundamentals of Microprocessors**

P. Pages : 2

Time : Three Hours



**GUG/S/25/14015**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.

1. a) Convert  $(725.25)_8$  to its decimal, binary and Hexadecimal equivalent. 8
- b) Minimize the following expression using K-map and realize it using the basic gates. 8  
 $F(A, B, C, D) = \sum(0, 1, 2, 3, 7, 8, 9, 10, 11, 12, 13)$

**OR**

2. a) i) Identify the logic gates for the following conditions. 8
- All low inputs produce a high output.
  - Output is high if and only if all inputs are high.
  - Output is low if and only if all inputs are high.
  - Output is low if and only if all inputs are lows.
- ii) What are logic circuits? Draw the logic diagram for the following expression 8  
 $Y = \bar{A}BC + AD + A\bar{C}D$
- b) Convert the following expression into their standard SOP or POS forms. 8  
 $F = AB + \bar{A}C + BC \quad F = (A + B) \cdot (\bar{A} + \bar{C}) \cdot (B + C)$
3. a) What is full adder? Design a full adder circuit using two half adders. 8
- b) Implement  $f(A, B, C, D) = \sum m(0, 3, 4, 7, 9, 13, 15)$  using 4:1 MUX. 8

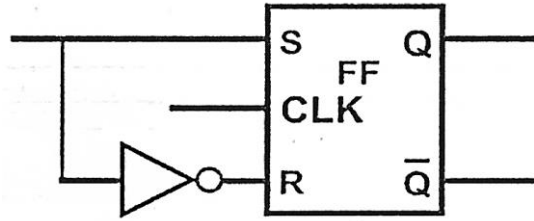
**OR**

4. a) Implement the BCD to 7 segment driver in its standard form with various digital displays, a truth table and different types. 10
- b) Obtain the design of the given function using suitable multiplexer  $F = \sum m(0, 2, 5, 7)$ . 6
5. a) What is master slave JK flip-flop? Give logic diagram of J-k master slave flip-flop using NAND gates Explain the working? How is race around condition eliminated by using this configuration. 8
- b) What do you mean by latch? Design the SR latch by NAND gate also write the drawback of SR latch. 8

**OR**

6. a) Draw the logic symbols of all shift registers and discuss PISO in detail. 8

b) 8



Analyze the given block diagram and design the flip-flop

7. a) Write a program to add two 16 bit numbers present at memory locations 4801H, 4802H and 4803H, 4804H. Store the result into M.L.4805H, 4806H. 8

b) Draw the flag register of 8085 microprocessor and explain how flags are getting affected with the help of suitable arithmetic operation. 8

**OR**

8. a) Enlist & explain all 16 bit registers associated with 8085 and write the role of HL register pair as a memory pointer. 8

b) Discuss the function of Instruction Register, Instruction decoder and timing & control circuits in relation with the sequence of operation of the fetched instructions. 8

9. a) Differentiate between I/O mapped I/O ports and Memory mapped I/O ports with microprocessor 8085. 8

b) Interpret the interfacing of 4KB EPROM IC with Microprocessor 8085 using starting address 2000H with required chip select signal. 8

**OR**

10. a) Discuss the architecture of 8279. 8

b) Write a short note on “Interfacing of input devices with 8085 Microprocessor”. 8

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