

Day: Tuesday
Date: 14/05/2019

S-2019-2589

Time: 02.30 PM TO 05.30 PM
Max Marks. 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks
- 3) Draw the labeled diagrams **WHEREVER** necessary

Q.1 a) What is binary no? Discuss the procedure to convert **(05)**
i) Binary number to decimal number.
ii) Decimal number to binary number.

b) Simplify following expression using k-map and draw logic diagram **(05)**
 $F = \pi M(0, 1, 3, 5, 6, 7, 10, 14, 15)$

OR

a) What are the basic rules of Boolean algebra? **(05)**

b) Design a combinational logic circuit having 3 input, & output is equal to 1, if input variable have more 1's than 0's otherwise the output is 0. **(05)**

Q.2 a) Implement the following Boolean function using 8:1 MUX **(05)**
 $f(A,B,C,D) = \sum m(0,1,3,4,8,9,15)$

b) What is full adder? Design a full adder using two half adders. **(05)**

OR

a) How do you convert binary no. to corresponding gray code using a code converter? **(05)**

b) What do you mean by De-MUX? Explain it with one example. **(05)**

Q.3 a) Draw CMOS inverter diagram. **(03)**

b) Define following **(07)**

- i) Fan in ii) Fan out iii) Noise margin
- iv) Power dissipation v) Propagation delay.

OR

a) What are logic families? Explain any one in detail. **(05)**

b) What is meant by TTL? Explain any one configuration of TTL family **(05)**

Q.4 a) Design and explain RS-latch using NOR gates. **(05)**

b) What is the classification of sequential machine? Explain in detail. **(05)**

OR

- a) What is D-flip flop? Draw and explain it with truth table. (05)
- b) What is the purpose behind state reduction? Find out reduced state diagram for following state table using state reduction. (05)

| Present state | Next state | | Output | |
|---------------|------------|-----|--------|-----|
| | X=0 | X=1 | X=0 | X=1 |
| a | a | b | 0 | 0 |
| b | c | d | 0 | 0 |
| c | d | d | 0 | 0 |
| d | e | f | 0 | 1 |
| e | a | f | 0 | 1 |
| f | g | f | 0 | 1 |
| g | a | f | 0 | 1 |

- Q.5 a) What are the applications of shift registers? Explain any one in detail. (05)
- b) Design and explain 4 bit asynchronous up counter. (05)

OR

- a) What is modules counter? Explain MOD-4 counter in detail. (05)
- b) What is meant by Bidirectional shift register? Explain it with neat diagram. (05)

- Q.6 a) A combinational circuit is defined by function (05)
 $F_1 = \sum m(1,5,7)$
 $F_2 = \sum m(5,6,7)$
Implement the circuit with PLA

- b) What is classification of RAM? Explain any one in detail. (05)

OR

- a) Explain basic memory operation with suitable block diagram. (05)
- b) What is the difference between PAL & PLA and PROM? (05)

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