

K-985

Total Page No. : 4]

[Roll No.]

MIT (CS)-302

**MSCCS IIIrd Year Examination
Dec., 2023**

**INTRODUCTION TO DIGITAL
SYSTEMS**

Time : 2 Hours]

[Max. Marks : 70

Note :- This paper is of Seventy (70) marks divided into two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given there in. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section-A

(Long Answer Type Questions) 2×19=38

Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

K-985

(1)

P.T.O.

1. Minimize the following expression in SOP form using K-map :
 - (i) $f(A, B, C, D) = \Sigma m(0, 1, 4, 8, 9, 10) + d(2, 11)$
 - (ii) $f(p, q, r, s) = \Sigma m(1, 2, 3, 5, 6, 7, 11, 12, 13, 14, 15)$
 and draw the logic diagram.

2. Design full adder using two half adders. What are the drawbacks of full what is a full adder is POS form.

3. Design a 32 : 1 Mux by using 8 : 1 Mux. With the help of logic diagram, explain the 4 bit universal shift register using D flip-flops and 4 : 1 MUX.

4. Compare combinational and sequential circuit. Differentiate between synchronous and asynchronous sequential circuit. Design a synchronous counter that goes through the counting sequence 1-2-4-7-1..... by using D flip-flop.

5. With the help of logic diagram, explain working of Master slave JK Flip-flop along with waveforms. Explain race around condition. How is it eliminated ?

Section–B

(Short Answer Type Questions) 4×8=32

Note :- Section ‘B’ contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

- Convert the following expressions to the canonical form :
 - $F = AB' + A'C + A$
 - $F = (A + B)(B' + C)$
- Design an encoder and a decoder & differentiate between them.
- What is Johnson’s counter ? Construct the Johnson’s counter with 8 timing signal.
- Explain Flip-flop in detail.
- What is the principle of Quine-Mcclusky Method ?
- Design a 4-input combinational circuit that converts binary code to gray code.
- Write short note on any *two* of the following :
 - ROM
 - RAM
 - DRAM
 - Flash memory

8. Explain how shift register can be used as :
- (a) Serial to parallel data converter and
 - (b) Parallel to serial data converter
