Question Paper

Exam Date & Time: 28-Dec-2022 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATION - DECEMBER 2022
III SEMESTER B.Sc (Applied Sciences) in Engg.
ANALOG AND DIGITAL SYSTEM DESIGN [IMET 234]

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

Missing data may be suitably assumed.

1) A) Implement the following Boolean function using an 8:1 multiplexer. (3)

$$F(A, B, C, D) = A\bar{B} + BD + \bar{B}C\bar{D}.$$

B) Simplify the equation given below to obtain a minimal SOP expression using QM technique. (7)

$$F(A,B,C,D) = \sum m(0,5,6,8,11,14,15) + d(2,4,10,12)$$

2) A) Convert (i) T flip-flop into JK flip-flop. (6)
(ii) JK flip-flop to SR flip-flop.
Explain with truth table and excitation table neatly.

B) Draw and explain the operation and utility of a master slave flip-flop. (4)
Explain race around condition.

3) A) Explain the working of an asynchronous Decade Counter with neat logic diagram, timing diagram and the count table. (5)

B) Explain briefly each stage of the op-amp with its block schematic. Draw the basic differential amplifier circuit using transistors and explain its working when a common mode signal is applied. (5)

4) A) Minimize the logic function $Y(A, B, C, D) = \sum m(1,3,5,8,9,11,15) + d(2,13)$. (4)
Use Karnaugh map and draw simplified logic circuit.

B) Design a synchronous counter, using D Flip Flops, which generates the following sequence. 2-4-5-8-2-4-5-8-..... (6)

5) Differentiate between combinational and sequential circuits. Draw the block diagram for asynchronous sequential circuit and explain briefly. (4)