A-102

Total Pages : 4 **Roll No. ----------**

MPHY-509

Digital Electronics

M.Sc. Physics (MSCPHY)

2nd Semester, Examination 2024 (June)

Time: 2:00 hrs Max. Marks: 35

Note : This paper is of Thirty five (35) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. 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)

Note : Section 'A' contains Five (05) long-answer-type questions of Nine and Half (9.5) marks each. Learners are required to answer any Two (02) questions only.

[2x9.5=19]

P.T.O.

Q.1. Explain about various logic gates with suitable symbols and truth tables.

Q.2. Differentiate between the half and full adder. Draw the logic diagram and truth table for a half adder and full adder and explain their working. How many half adders required to make a full adder?

Q.3. What is a sequential circuit? Explain the operation of JK flip flop with suitable logic diagram.

Q.4. What is a counter? Explain the working of Asynchronous counter with neat and clean diagram?

Q.5. Give a brief explanation of an Analog to Digital (A/D) converter and the need for the A/D conversions.

Section-B (Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only.

[4x4=16]

Q.1. Draw the EX-NOR by using the NAND gate? Explain its working with the help of truth table.

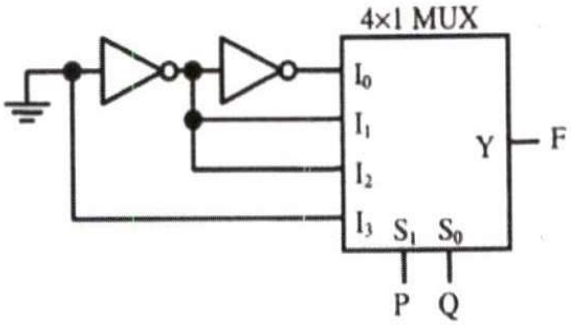
Q.2. Writes D' Morgans theorem equations. Use De'Morgan's theorem to simplify the expression $Y= ((A+B)' + A' + AB)' = 0$.

Q.3. What is race around condition? Which flip-flop presents race around condition.

Q.4. What is the clock? What do you mean by clock enable in the working of shift register?

Q.5. Draw the pin diagrams of Serial-in/parallel-out (SIPO) and Serial-in/serial-out (SISO) shift resistor?

Q.6. Find out the logic function implemented by the circuit below is (ground implies a logic '0')



Q.7. Let the representation of a number in base 3 be 210. What is the hexadecimal representation of the number?

Q.8. Give the truth table of T flip flop. Also write the characteristic equation for T flip-flop?

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