School of Computing Science and Engineering
B.Tech CSE
ETE - Jun 2023

Time : 3 Hours   Marks : 100

Sem II - G2UC101B / BEE01T1005
Introduction of Digital System
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1. Differentiate between   K3 CO2 (5)
  (a) a latch & a flipflop.
  (b) T flipflop & D flipflop.

2. (a) Differentiate Signed Binary number and Unsigned Binary number?   K1 CO1 (5)
  (b) Represent +127 and -127 using 8-bit 1's compliment form.

3. Convert (A+B).(A+C).(B+C') into standard POS form.   K2 CO1 (5)

4. (a) Simplify the boolean expression Y= (A + B). (A'C' + C). (B'+AC)'.   K4 CO3 (10)
  (b) Realize Y = (A + B + C + D)' using 2-input NOR gates only.

OR

Draw the circuit using logic gates of a T-type flip-flop. Draw its symbol and write its truth table.   K4 CO3 (10)

5. (a) Convert Octal (1745) to hexadecimal.   K1 CO1 (10)
  (b) With neat sketch, realize the expression Y = AB + CD by NAND gates only.
  (c) Convert the Octal number (1072) to decimal.

6. Explain the operation of SR latch using NAND & NOR gate.   K4 CO3 (10)

7. Draw and explain the truth table, boolean expression and circuit diagram of a BCD adder.   K2 CO1 (10)

8. Consider the SOP equation x=A'BC'D + A'BCD' + AB'CD' + AB'CD + ABC'D' = ABC'D + ABCD'.   K3 CO2 (15)
  (a) Use a K-map to produce the simplest SOP solution.
  (b) How can you represent the above equation using XOR gates in combination with other
gates? Draw a circuit diagram of your solution using XOR gates.

9. Minimize the four-variable logic function using K-Map, $f(A, B, C, D) = \sum m(1,2,6,7,8,13,14,15) +$ K4 CO3 (15)
d(3,5,12).
Make a K-map for the function, $f(A, B, C, D) =$ M (3,4,5,7,11,13,15)) + d(6,8,10,12).

OR

Design a Binary to Gray code converter. Represent the decimal number 4096 in Gray code.   K4 CO4 (15)

10. (a) Simplify the expression z= (B+BC) (B+B'C) (B+D)   K3 CO2 (15)
  (b) Design a logic circuit that will allow a signal to pass to the output only when control inputs B
   &C are both HIGH, otherwise, the output will stay LOW.