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National Institute of Technology, Hamirpur
Department of Electronics and Communication Engineering
End Semester Examination, December 2022

Course: Digital Electronics & Logic Design (EC-211)   Time: 03 hours
Class: B. Tech(EE) (3rd Sem.)   Max Marks: 50

Note:
  1. Attempt all the questions.
  2. Assume missing data appropriately.
  3. Marks of each question is given in the right side of each question in square bracket.

1. (i) What is the value of a binary number with n bits all of which are 1s.   **[2*5]**

    (ii) Multiply a binary number 1101.11 to 101.1

    (iii) Multiply a Hexadecimal number 5A9B to 7

    (iv) Convert $(85)_{12}$ into Gray Code.

    (v) Detect and correct the error in the even parity Hamming code word 0111110.

2. (a) $F(A,B,C)=\overline{A}C + BC + AB$, minimize the expression and implement it   **[5+5]**
    using CMOS and NMOS.

    (b)$F(A,B,C)=A\odot B\oplus C$, make the truth table for F and implement using NOR
    gate.

3. (a) Implement $F_1=\sum m(1,2,4,7,8,11,12,13)$ and $F_2 =\sum m(2,3,9,11)$ using   **[5+5]**
    4:16 decoder.

    (b) Implement $F=\sum m(0,1,3,5,8,11,12,14,15)$ using 16:1 MUX.

4. (a)The waveforms shown in Figure given below are applied to negative edge   **[5+5]**
    triggered J-K flip flop with active-HIGH PRESET and CLEAR. Draw the
    output waveform.
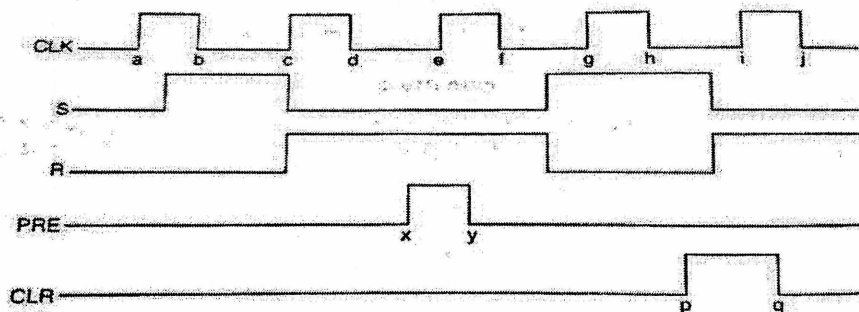
    (b) Minimize the boolean function $F(A,B,C,D)= \sum m(1,2,3,5,7,8,9) +$
    $d(12,14)$ using Variable Entrant Map method.

5. Design a synchronous Modulo-10 up/down counter using T FFs.   **[10]**