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Roll No:.....

Electronics & Communication Engineering Department  
National Institute of Technology Hamirpur (H.P.) -177005

End Semester Examination, Nov-Dec 2022

Course Code: EC-211 (CSE)

Time: 3 Hrs.

Course Name: Digital Electronics and Logic Design

Maximum Marks: 50

Note: All questions are compulsory and carry equal marks.

**Q.1 a)** Convert the following numbers with the indicated bases to decimal

(i)  $(4310)_5$  (ii)  $(198)_{12}$  (iii)  $(735)_8$  (iv)  $(525)_6$

(v) What is the largest binary number that can be expressed with 14 bits? What is the equivalent decimal number?

**Q.1 b)** Represent the decimal number 27 in binary form using (i) BCD code (ii) Excess-3 code (iii) Gray code (iv) Octal code (v) Hexadecimal code

**Q.2 a)** Compare the parameters of RTL, TTL and ECL logic families based on following:

(i) Propagation delay (ii) Power dissipation (iii) Fan-out (iv) Basic gate

**Q.2 b)** Define Minterms and Maxterms? Define the Minterms and maxterms by using three binary variables in tabular form with proper designations.

**Q.3 a)** Draw logic diagrams to implement the following Boolean expressions:

(i)  $Y = A + B + B'(A + C')$  (ii)  $Y = A(B \oplus D) + C'$  (iii)  $Y = A + CD + ABC$

(iv)  $Y = (A \oplus C)' + B$  (v)  $Y = (A' + B')(C + D')$

**Q.3 b)** (i) Simplify the Boolean function by using K-map

$$F = A'B'C' + B'CD' + A'BCD' + AB'C'$$

(ii) Simplify the Boolean function

$$F_1(A, B, C, D, E) = \sum (0, 2, 4, 6, 9, 13, 21, 23, 25, 29, 31)$$

Or

(iii) Simplify the Boolean function using  $F(A, B, C, D) = \sum m(0, 1, 3, 7, 8, 9, 11, 15)$  by using tabulation method.

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Q.4 a) A combinational circuit is specified by the following three Boolean functions:

$$F_1(A, B, C) = \sum (2, 4, 7)$$

$$F_2(A, B, C) = \sum (0, 3)$$

$$F_3(A, B, C) = \sum (0, 2, 3, 4, 7)$$

Implement the circuit with a decoder constructed with NAND gate connected to the decoder output. Use a block diagram for the decoder (3x8).

Or

Q.4 b) Design 4 x 16 decoder by using 2 x 4 decoder.

Q.4 c) Implement the given Boolean function with a multiplexer with three selection inputs

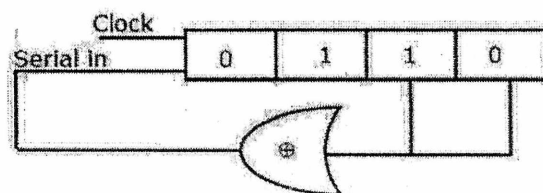
$$F(A, B, C, D) = \sum (1, 3, 4, 11, 12, 13, 14, 15)$$

Q.5 a) What is the difference between Latch and Flip flop? Draw the logic diagram and write the function table of SR latch, D flip flop and T flip flop.

Q.5 b) Describe the working of JK flip flop and Master-Slave JK Flip-Flop with Truth Table and Logic diagram.

Or

Q.5 c) For the given register, after how many clocks pulse same data repeat and find the data after three clock pluses are applied.



\*\*\*\*\*ALL The Best\*\*\*\*\*