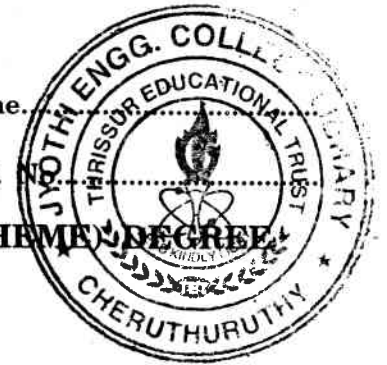


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Name.....

Reg. No.....



**FOURTH SEMESTER B.TECH. [ENGINEERING] (14 SCHEME) DEGREE
EXAMINATION, APRIL 2016**

EE 14 405—DIGITAL ELECTRONICS

Time : Three Hours

Maximum : 100 Marks

Part A

1: Answer any *eight* questions :

- 1 Express the following function in sum of minterm and product of maxterm
 $F(A, B, C, D) = B'D + A'D + BD$.
- 2 Obtain 1' and 2' complement for the following binary numbers :—
 - (a) 11101010
 - (b) 01111110
 - (c) 00000001
 - (d) 10000000
 - (e) 00000000
- 3 Convert the following function into canonical form $F(x, y, z) = \Sigma(1, 3, 7)$.
- 4 Implement a full adder with two 4×1 multiplexers.
- 5 Explain about Master-Slave D flip-flop ?
- 6 Design a combinational circuit that converts a 4 bit gray code to a 4 bit binary number and implement the circuit with exclusive OR gate.
- 7 Design a half adder with input x and y and outputs S and C . The circuits add the inputs and place the outputs in S and C .
- 8 Design a 4-bit binary synchronous counter with D flip-flops.
- 9 Explain about the construction of Johnson counter ?
- 10 Explain about the instruction set of 8085 ?

(8 × 5 = 40 marks)

Part B

2. (a) Simplify the following Boolean expression to a minimum number of literal

- (a) $XY + XY'$.
- (b) $ABC + A'B + ABC'$.

Or

- (b) Simplify the Boolean function $F(w, x, y, z) = \Sigma(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$ using Karnaugh map.

Turn over

3. (a) A combinational circuit is defined by the following Boolean function $F_1 = X'Y'Z' + XZ$
 $F_2 = XY'Z' + XY$ $F_3 = X'YZ + XY$. Design the circuit with a decoder.

Or

- (b) Implement the following Boolean function with PLA $A(x, y, z) = \Sigma(1, 2, 4, 6)$
 $B(x, y, z) = \Sigma(0, 1, 6, 7)$ $C(x, y, z) = \Sigma(2, 6)$ $D(x, y, z) = \Sigma(1, 2, 3, 5, 7)$.
4. (a) A sequential circuit has two JK flip-flops A and B and one input x . The circuit is described by the following flip-flop input equations :

$$J_A = x \quad K_A = B'$$

$$J_B = x \quad K_B = A$$

- (a) Draw the logic diagram of the circuit.
 (b) Tabulate the state table.
 (c) Derive the state equations $A(t+1)$ and $B(t+1)$ by substituting the input equations for the J and K variables.

Or

- (b) Draw the logic diagram of a 4-bit ripple down counter using (a) flip-flops that trigger on the positive edge of the clock ; (b) flip-flops that trigger on the negative edge of the clock.
5. (a) With a neat diagram, briefly explain about the architecture of 8085 ?

Or

- (b) (i) Write a program using ADI instruction to add two hexadecimal numbers 3 AH and 48 H.
 (ii) Discuss about mode 0 and mode 1 operation of 8255 ?

(4 × 15 = 60 marks)