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(4)

7. (a) Draw and explain the operation of a full subtractor. 8
(b) Implement JK flip flop using SR flip flop. Also write excitation table and truth table for JK flip flop. 8
8. (a) Draw and explain the operation of 4-bit UP-DOWN counter. 8
(b) Draw the architecture of static RAM cell using MOS technology. 8
9. (a) Explain the operation of bidirectional shift register. 8
(b) Design divide-by-5 ripple counter using flip flops. 8

Unit-IV

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MCA 1st Semester Current Scheme (with new notes)
Maximum Marks Scheme 80 Examination,

December-2015

DIGITAL DESIGN

Paper-MCA-103

Time allowed : 3 hours] [Maximum marks : 80

Note: Question No. 1 is compulsory. Attempt four more questions selecting at least one from each unit.

1. (a) Realize $AB + CD = \overline{AB} \cdot \overline{CD}$ using AND-OR configuration.
(b) Convert $(247.36)_8 = ()_{16}$
(c) Prove $B \oplus (B \oplus A.C) = AC$
(d) Draw circuit diagram for CMOS NOR gate
(e) Convert $Y = (A + B)(A + C)(B + \overline{C})$ into standard POS form.
(f) Write a short note on encoder.
(g) Convert JK flip flop into D flip flop.
(h) Differentiate between synchronous counter and asynchronous counter. 16

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67043-P-4-Q-9 (15)

[P.T.O.]

Unit-I

2. (a) Calculate the following:
- 10101×110
 - 11011×1011
 - $10110 \div 100$
 - $111 \div (10)$
 - $(75)_8 + (26)_8 = ()_8$
 - $(2F9A)_{16} + (0BF85)_{16} = ()_{16}$
- (b) Represent the decimal number 4096 in binary code, BCD code, excess-3 code, octal code, Hex code.
3. (a) Determine :
- 1 - bit
 - 2 - bit
 - 3 - bit gray codes and tabulate along with their equivalent decimal numbers.
- (b) Calculate the hamming code of 01010100011.
- (c) Write a short note on Excess 3 code, alphanumeric code, BCD code, Gray code.

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Unit-II

4. (a) Prove :
- $\overline{A\overline{B}C} + \overline{A\overline{B}C} = 1$
 - $\overline{A} \cdot B + A\overline{B} + AB = A + B$
 - $C(B + C)(A + B + C) = C$
- (b) Compare TTL and ECL logic family.
5. (a) Prove :
- $$\overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC} = \overline{A} + \overline{B} + \overline{C}$$
- Realise using basic logic gated.
- (b) Minimize function using K - map.
- $$F(A, B, C, D) = \Sigma (1, 3, 4, 5, 6, 7, 9, 12, 13)$$
6. (a) Realize the following boolean expression using 4:1 MUX (S) only
- $$Z = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}B\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}D + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D$$
- (b) Write and draw the circuit diagram of Master slave JK flip flop.

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[P.T.O.]