Code: 13A04303 **R13/SS**

B.Tech II Year II Semester (R13) Regular Examinations May/June 2015

SWITCHING THEORY & LOGIC DESIGN

(Common to EEE and ECE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Convert $(749)_{10}$ to binary number system.

(b) Give the importance of Boolean algebra and mention any one property.

(c) Convert $(24AD)_{16}$ to octal number system.

(d) What are SOP and POS forms? Give examples.

(e) What is an encoder?

(f) What are arithmetic circuits and logical circuits?

(g) Write differences between sequential and combinational circuits.

(h) What is a shift register?

(i) Compare three combinational circuits PLA, PAL and ROM.

(j) Define race free state assignment.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Convert the following numbers: (i) $(3453)_{10}$ to base 8. (ii) $(6543)_{12}$ to base 16.

(b) Find the complement of the function $F = A + BC$, then show that $F.\overline{F} = 0\ and\ F + \overline{F} = 1$.

(OR)

3 Reduce the following Boolean expression into the indicated number of literals:

(a) $\overline{A}\,\overline{C} + ABC + A\overline{C}$ to 3 literals.

(b) $\left(\overline{X}.\overline{Y} + \overline{Z}\right) + Z + XY + WZ$ to 3 literals.

(c) $\overline{A}\,\overline{B}\left(\overline{D} + \overline{C}D\right) + B(A + \overline{A}CD)$ to 1 literals.

(d) $(\overline{A} + C)(\overline{A} + \overline{C})(A + B + \overline{C}D)$ to 4 lierals.

UNIT – II

4 Convert given expressions in to standard SOP and POS forms:

(i) $F(A,B,C) = AC + AB + BC$. (ii) $F(A,B,C) = (A + B)(B + C)(A + C)$.

(OR)

5 (a) Reduce the following using K-map technique.

(i) $F(a,b,c,d) = m(5,6,7,12,13) + d(4,9,14,15)$. (ii) $F(a,b,c) = m(2,5,7) + d(1,3)$.

(b) Simplify $F(A,B,C,D) = m(2,3,5,7,8,10,12,13)$ using tabulation method.

UNIT – III

6 (a) Write short notes on multiplexer and design a multiplexer 16-to-1 with the help of 4-to-1 multiplexers.

(b) Realize a full-adder using only NOR gates and explain.

(OR)

7 (a) Draw the figure of encoder & decoder and explain their functions.

(b) Write about magnitude comparator and give any one application.

UNIT – IV

8 (a) Convert SR-flip-flop into JK flip-flop.

(b) Draw the state diagram and state table of the serial binary adder and implement by using D flip-flop.

(OR)

9 (a) Design a ripple counter by considering any one example.

(b) Explain the method of carry look ahead adder circuit with the help of its logic diagrams.

UNIT – V

10 (a) Implement PLA circuit for the following functions $F1(A,B,C) = (3,5,6,7),\ F2 = (A,B,C) = (0,2,4,7)$.

(b) How does a programmable logic device differ from a fixed logic device? What are the primary advantages of using programmable logic devices?

(OR)

11 (a) Give the logic implementation of a 32 × 4 bit ROM using a decoder of a suitable figure.

(b) A 12-bit hamming code word containing 8-bits of data and 4-parity bits is read from memory. What is the original data word for these hamming codes? (i) 001111101010. (ii) 101110010110.

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