Reg. No. : | | | | | | | | | | |

Question Paper Code: 50432

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Electronics and Communication Engineering

15UEC302 - DIGITAL ELECTRONICS AND DESIGN

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The equivalent of A.A is

   (a) A (b) 0 (c) 1 (d) $\overline{A}$

2. What is the equivalent gray code for the binary code 111?

   (a) 101 (b) 100 (c) 000 (d) 001

3. Delay flip flop means

   (a) D flip flop (b) RS flip flop (c) JK flip flop (d) T flip flop

4. How many flip flops are needed for a synchronous mod-3 counter?

   (a) 3 (b) 4 (c) 1 (d) 2

5. In programmable logic array (PLA) which array is programmed and which array is fixed?

   (a) AND array is fixed, OR array is programmed
   (b) Both AND & OR arrays are programmed
   (c) OR array is fixed, AND array is programmed
   (d) none to these

PART - B (5 x 3 = 15 Marks)

6. Prove that $A+\overline{A}B = A + B$.

7. Write the difference between Decoder and Demultiplexer.

8. Derive the characteristic equation of SR flip flop.

9. Define Hazards and its types.

10. Mention the advantages and disadvantages of CMOS family.

PART - C (5 x 16 = 80 Marks)

11. (a) Using the K-Map method, simplify the following function, obtain their SOP and POS form $F(w, x, y, z) = \sum(1, 3, 4, 5, 6, 7, 9, 12, 13)$. (16)

Or

(b) Simplify the following Boolean function by using Quine-McCluskey method $F(A, B, C, D) = \sum m(0,2,3,6,7,8,10,12,13)$. (16)

12. (a) Design a 2-bit comparator using gates. (16)

Or

(b) Implement the function with a multiplexer. $F(A, B, C, D) = \sum m(0,1,3,4,8,9,15)$.(16)

13. (a) Design a synchronous Mod-4 down counter using JK flip flop. (16)

Or

(b) Explain about shift register and its modes of operation. (16)

14. (a) Design an asynchronous sequential circuit with two inputs X and Y and with one output Z. Whenever Y is 1, input X is transferred to Z. When Y is 0, the output does not change for any change in X. (16)

Or

(b) Draw the K-Map for the function $F(A, B, C, D) = \Pi M(2, 3, 6, 8, 9, 12, 13, 14)$. Determine the minimized function in product of sums form. Are there any static-0 hazards in the minimized function? If yes, find them and eliminate them. (16)

15. (a) Explain about RAM organization and its types. (16)

Or

(b) Design and implement 3 bit binary to gray code converter using PLA. (16)

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