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Reg. No. :

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B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Second Semester

Computer science and Engineering

15UCS208 - DIGITAL PRINCIPLES AND SYSTEM DESIGN

(Common to Information Technology)

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The binary equivalent of $(1011.011)_{10}$ is equal to   CO1-R

   (a)11.375   (b) 10.123   (c) 11.175   (d) 9.234

2. The minterm expansion of $f(P, Q, R) = PQ + QR' + PR'$ is   CO1-App
   _____.

   (a) m2+m4+m6+m7   (b) m0+m1+m3+m5   (c) m0+m1+m6+m7   (d) m2+m3+m4+m5

3. Excess-3 code is known as   CO2-R

   (a) Weighted Code   (b) Cyclic redundancy Code

   (c) Self – Complementing Code   (d) Algebraic Code

4. The binary representation of BCD number 00101001 (decimal 29) is   CO2-App

   (a) 1101001   (b) 0101011   (c) 0011101   (d) 0110101

5. The process of recording any music in any recorder is _____.   CO3-R

   (a) Encoding   (b) Multiplexing

   (c) Decoding   (d) None of the Mentioned

6. Product terms are the outputs of which type of gate within a PLD   CO3-R
   array

   (a) OR   (b) XOR   (c) AND   (d) FLIP-FLOP

7. The logic circuit whose output at any instant of time depends only on the present input but also on the past outputs is _____.   CO4-R

   (a) Flip-flops   (b) Combinational circuits

   (c) Latches   (d) Sequential circuits

8. For JK flip Flop with J=1, K=0, the output after clock pulse will be   CO4-R

   (a) 0   (b) 1

   (c) high impedance   (d) No change

9. Table that is not a part of asynchronous analysis procedure is_____.   CO5-R

   (a) flow table   (b) excitation table   (c) state table   (d) transition table

10. Present states of asynchronous circuits are also called as   CO5-R

    (a) Secondary Variables   (b) Primary Variables

    (c) Excitation Variables   (d) Short term Memories

PART – B (5 x 2= 10Marks)

11. List the number systems   CO1-R

12. What is code conversion?   CO2-R

13. List basic types of programmable logic devices   CO3-U

14. What is the difference between synchronous and asynchronous counter?   CO4-R

15. List out the steps for the design of asynchronous sequential circuit   CO5-R

PART – C (5 x 16= 80Marks)

16. (a) (i) Explain BCD Code with Examples.   CO1-U   (10)

         (ii) Describe negative and positive logic.   CO1-U   (6)

                                  Or

    (b) Minimize the following Boolean expression using Boolean   CO1-U   (16)
         identities   F(A, B, C)=A′B+BC′+BC+AB′C′.

17. (a) Write short notes on: BCD adder, Binary multiplier and   CO2-U   (16)
         Magnitude Comparator

                                  Or

52208A

(b) Describe and design a combinational circuit to convert binary   CO2-U   (16)
code to gray code.

18. (a) Implement the combinational circuit with a PLA having 3   CO3-App   (16)
inputs, 4 product terms and 2 outputs for the functions $F_1 = \sum m(3, 5, 6, 7)$, $F_2 = \sum m(0, 2, 4, 7)$.

Or

(b) Design using PLA.   CO3-App   (16)

$A(x,y,z) = \sum m(1,2,4,6)$

$B(x,y,z) = \sum m(0,1,6,7)$

$C(x,y,z) = \sum m(2,6)$

19. (a) Using JK flip flops, design a parallel counter which counts in   CO4-App   (16)
the sequence 000,111,101,110,001,010,000 ......& repeats.

Or

(b) Consider the design of 4-bit BCD counter that counts in the   CO4-App   (16)
following way: 0000, 0001, 0010... 1001 and back to
0000.Draw the logic diagram of this circuit and describe it.

20. (a) Design an asynchronous circuit that has two inputs x_1 and x_2 and   CO5-App   (16)
one output Z. the circuit is required to give an output whenever
the input sequence (0, 0) (0, 1) and (1, 1) received but only in
that order.

Or

(b) For a given Boolean function obtain the hazard free circuit and   CO5-App   (16)
examine it. $F(A,B,C,D) = \sum m(1,3,6,7,13,15)$

52208A