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Question Paper Code: 52208

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 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 - (5 x 1 = 5 Marks)

1. Find the hexadecimal equivalent of the decimal number 100 CO1- R
(a) 46 (b)64 (c) E2 (d) None of these
2. Advantage of Excess 3 Code CO2- R
(a) Min distance (b) Self complement (c) Hamming code (d) None of these
3. Number of selection lines required for 32 x 1 Multiplexer is CO3- R
(a) 3 (b) 4 (c) 5 (d) None of these
4. No of Flip-flops required to design MOD 50 counter CO4- R
(a) 4 (b) 5 (c) 6 (d) None of these
5. Two types of Hazards are CO5- R
(a) Static & dynamic (b) Active & Passive (c) Static 1 & Static 0 (d) None of these

PART – B (5 x 3= 15 Marks)

6. Why NAND and NOR gates are called universal gates? CO1- R
7. State the significant features of Gray code. CO2- R
8. State the difference between PLA and PAL CO3- R
9. List the different types of shift registers. CO4- R
10. Define: Hazard CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Simplify the following Boolean function using QM method and implement it by using only NOR gates. CO1- App (16)
 $F(A,B,C,D)=\sum m(0,2,3,4,7,8,10,11,14)+ \sum d(5,6,15)$

Or

- (b) (i)Simplify the following using Karnaugh map method: CO1- App (8)
 $F(A,B,C,D)=\sum m(0,4,10,11,13,14)+ \sum d(2,8,15)$
 And implement the circuit using only NAND gates.

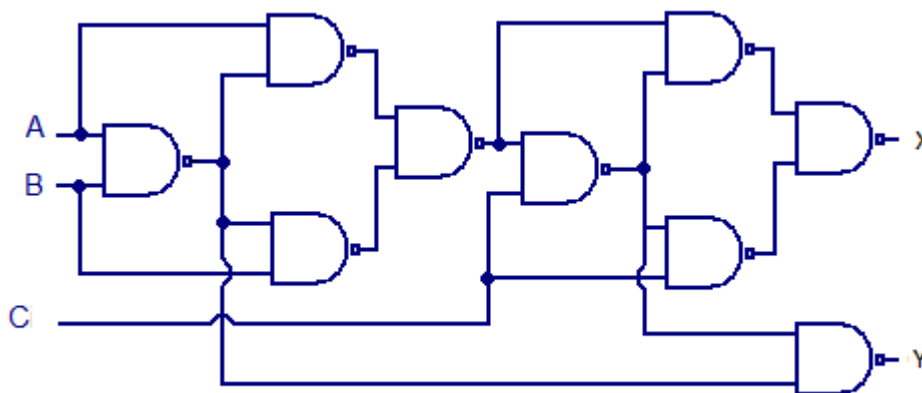
- (ii) Design a full adder (using Karnaugh map method) and implement it using only NAND gates CO1- App (8)

12. (a) Perform the following operations in 2's complement system. Use eight bits (including sign bit) for each number. Check your results by converting the binary result back to decimal. CO2- App (16)

- (i) Add + 10 to -20
- (ii) Add -48 to +88
- (iii) Subtract+ 20 from -15
- (iv) Subtract -30 from -10

Or

- (b) Analyze the combinational circuit given below and obtain the Boolean expression and Truth table for the same. CO2- Ana (16)



13. (a) Design 8 x 1 Multiplexer and realize Full adder sum function using the same. CO3- Ana (16)

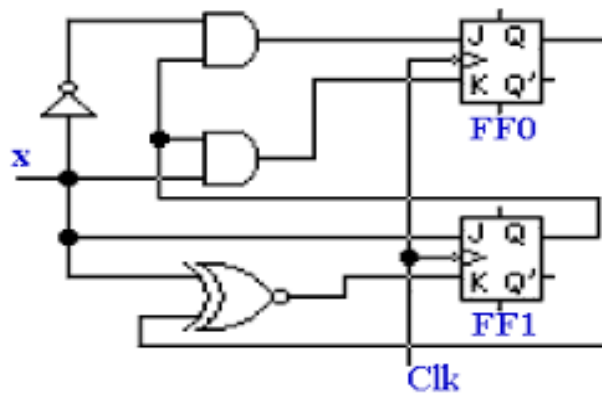
Or

- (b) Design BCD to Excess 3 code converter and implement it using PAL CO3- Ana (16)

14. (a) Design and construct MOD 8 Up/Down synchronous counter using JK flip flops. CO4- Ana (16)

Or

- (b) Analyze the sequential circuit given below and obtain the state diagram and state table for the same. CO4- Ana (16)



15. (a) Design an asynchronous sequential circuit that has two inputs X_1 and X_2 and one output Z . When $X_1=0$, the output $Z=0$. The first change in X_2 that occurs while X_1 is 1 will cause output Z to be 1. The output Z will remain 1 until X_1 returns to 0. CO5- Ana (16)

Or

- (b) Discuss in detail about Hazards and its countermeasures. CO5- Ana (16)

