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**Question Paper Code: 53402**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

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)

- Determine the values of A,B,C and D that makes the sum term  $A'+B+C'+D$  equal to zero CO1- U  
(a) A=1,B=0,C=0,D=0 (b) A=1,B=0,C=1,D=0  
(c) A=0,B=1,C=0,D=0 (d) A=1,B=0,C=1,D=1
- Before an SOP implementation, the expression  $X=AB(C'D+EF)$  would require a total of how many gates? CO2- R  
(a) 1 (b) 2 (c) 4 (d) 5
- How many Flip-Flops are in the 7475 IC? CO3- R  
(a) 1 (b) 2 (c) 4 (d) 8
- The time sequence of inputs, outputs, and flip-flop states can be enumerated in a CO4- R  
(a) Transition table (b) Truth table (c) Characteristic table (d) None of these
- The storage element for a static RAM is the \_\_\_\_\_. CO5-R  
(a) Diode (b) Resistor (c) Capacitor (d) Flip Flop

PART – B (5 x 3= 15 Marks)

- State various laws of Boolean algebra CO1- Ana
- What is binary decoder? CO2- R
- Give the excitation table of SR Flip- Flop CO3- R

9. Give the comparison between synchronous and asynchronous counters. CO4- R
10. What is Read cycle time? CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Simplify the following expression using K-map method and Draw the logic diagram  
 $F = \Sigma(3,6,7,8,10,12,14,17,19,20,21,24,25,27,31)$  CO1- App (16)
- Or
- (b) Minimize the given switching function using Quine McCluskey Method  
 $F(A,B,C,D) = \Sigma(0,2,3,7,8,10,12,13)$  CO1- App (16)
12. (a) Design a combinational circuits that converts 4 bit gray to BCD code converter and implement the circuit CO2- App (16)
- Or
- (b) Implement full subtractor using demultiplexer. CO2- U (16)
13. (a) Design an asynchronous BCD ripple counter using JK flip – flop. CO3- App (16)
- Or
- (b) Design a 3 bit Asynchronous Ripple counter using T Flip Flop and explain its operation. CO3- App (16)
14. (a) Design a asynchronous sequential circuit that has two inputs X and Y and one output Z. when Y=1, input X is transferred to Z. when Y=0,the output does not change for any change in X. CO4- Ana (16)
- Or
- (b) What is meant by Hazards? Explain the different types of Hazards. Design a hazard free circuit for  $y = \Sigma m(0,2,6,7,8,10,12)$ . CO4- Ana (16)
15. (a) Design using PLA the following functions  
 1.  $X(A, B, C) = \Sigma(0,1,2,4)$ .  
 2.  $Y(A, B, C) = \Sigma(0,5,6,7)$ . CO5- App (16)
- Or
- (b) Write a note on types of ROMs and ROM organization. CO5- App (16)