

GANPAT UNIVERSITY

B. Tech Semester – III Computer Engineering
Regular Examination November – December 2013
2CE302: Digital Electronics

Time: 3 Hours]

[Total Marks: 70

Instructions:

1. Attempt all questions.
2. Figures to the right indicate full marks.
3. Each section should be written in a separate answer book.

SECTION-I

1. (A) Do as directed [5]
 - (1) Perform $1001001 - 101101$ using 1's complement method.
 - (2) $(25A.25)_{16} = (\quad)_{10}$
 - (3) Convert 100111 to cyclic code
 - (4) Find octal value of $(4567)_{10}$
 - (5) Find 2's complement of 10110111
- (B) Implement basic logic gates using NAND and NOR gate [4]
- (C) Explain error detection code with an example. [3]

OR

1. (A) Do as directed [5]
 - (1) $(A12.21)_{16} = (\quad)_8$
 - (2) Perform $110101 - 1011$ using 2's complement method.
 - (3) Define : Duality
 - (4) Find Hexadecimal number of $(1020)_{10}$
 - (5) $(1000111)_2 = (\quad)_{10}$
 - (B) Implement Exclusive-OR using universal gates [4]
 - (C) Express Boolean function $F = P + Q'R$ in form of Maxterm [3]
2. (A) Prove $(A+BC'+C).C' = ABC' + AB'C' + A'BC'$ using Boolean algebra [3]
 - (B) Minimize the following Boolean function [4]

$$F(W, X, Y, Z) = \sum(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$$
 using Karnaugh Map method.
 - (C) Draw format for 5 variable karnaugh map with minterm representation. [4]

OR

2. (A) Explain full adder combination circuit with help of Half Adder [4]
 - (B) Minimize the following Boolean function [4]

$$F(A, B, C, D) = \sum(0, 1, 2, 4, 8, 10, 14, 15)$$
 and don't care condition $d(A, B, C, D) = \sum(3, 5, 8)$ using K – Map method
 - (C) Implement $F = A'B'C + AB + AD'$ using only basic logic gates. [3]
3. Answer the following (Any Two) [12]
 - (A) Discuss Tabulation method for simplification of Boolean function with suitable example
 - (B) Implement and Discuss a combinational circuit that convert BCD number to Excess- 3 code
 - (C) Discuss 4- bit magnitude comparator in brief.

[P.T.O.]

SECTION-II

4. (A) Answer the following [5]
- (1) What is difference between ROM and RAM.
 - (2) Define term : Latch
 - (3) What is the difference between synchronous and asynchronous counter?
 - (4) In JK-Flip-flop, $J=1$, $K=1$ and previous output $Q(t) = 1$ then what will be the value of $Q(t+1)$?
 - (5) What is the full name of VLSI?
- (B) Explain BCD adder in details. [4]
- (C) Implement boolean function $F(A,B,C) = \Sigma (0,2,4,7)$ using multiplexer. [3]

OR

4. (A) Answer the following [5]
- (1) Define term : Word time
 - (2) What is the difference between register and latch?
 - (3) Define term : Flip Flop
 - (4) In D Flip Flop, when $D=0$ and $Q(t)=1$, then $Q(t+1) =$ _____
 - (5) What is the full form of PROM?
- (B) Write a short note on "octal to binary encoder" [4]
- (C) Construct 4 X 16 decoder using 3 X 8 decoder [3]
5. (A) Explain Toggle flip-flop in details. [3]
- (B) Write a short note on "Serial Adder" [4]
- (C) Write the difference between combinational and sequential circuit. [4]

OR

5. (A) Write a short note on "Serial Transfer" [3]
- (B) Discuss Master – Slave J K flip flop in brief. [4]
- (C) Explain Programmable Logic Array (PLA) in detail. [4]
6. Answer the following (Any Two) [12]
- (1) Discuss 4-bit binary parallel adder with carry propagation mechanism.
 - (2) Explain Bi-directional shift register with parallel load
 - (3) Discuss asynchronous binary ripple counter in brief.

----- END OF PAPER -----