

Term Evaluation (Even) Semester Examination March 2025

Roll no . . . . .

Name of the Course: B Tech

Semester: II

Name of the Paper: *Basic Electronics Engineering*

Paper Code: TEC-201

Time: 1.5 hour

Maximum Marks: 50

Note:

- (i) Answer all the questions by choosing any one of the sub-questions
- (ii) Each question carries 10 marks

Q1. a Convert the following

CO1..... (10 Marks)

(i)  $(11001010.1001)_2 = (?)_{16} = (?)_8$

(ii) The solution of the quadratic equation  $x^2 - 11x + 22 = 0$  is  $x = 3$  or  $x = 6$ . What is the base of the numbers?

OR

b. Simplify the following expressions with the help of Boolean algebra:

(i)  $Z = A[B + C(AB + AC)]$

(ii)  $Z = A'B'C + (A+B+C)' + A'B'C'D$

(iii)  $F = A'BC + AB'C' + A'B'C' + AB'C + ABC$

(iv)  $F = AB + (AC)' + AB'C(AB + C)$

Q2.

CO1..... (10 Marks)

a. Convert the following function to its canonical form and find the min-terms and max-terms:

$$F(A, B, C, D) = AD' + BD + B'C$$

OR

b. Using K-Map, realize the following expression using a minimum number of gates

$$F(A, B, C, D) = A'B'C' + B'CD' + A'BCD' + AB'C'$$

Q3.

CO1. .... (10 Marks)

a. Given the following Boolean functions:

$$F = A'BCD + A'BCD' + AB'C'D' + ABC'D'$$

(i) Obtain the truth table of the function.

(ii) Draw the logic diagram using basic gates only.

OR

b. Prove the following Boolean identity

(i)  $A + B.C = (A+B)(A+C)$

(ii)  $B' + A.B = B' + A$

(iii)  $(A+B)(A+B')(A'+C) = AC$



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Q4.

CO1... (10 Marks)

- a. With the help of truth tables, prove De Morgan's theorem for three variables. What is meant by don't care condition.

OR

- b. A truth table has output 1s for these inputs: ABCD = 1011, ABCD = 1110, ABCD = 1001 and ABCD = 1111, and 0s for the other inputs. Draw the K-Map and find the simplified Boolean expression for the truth table.

Q5.

CO1... (10 Marks)

- a. Why NAND and NOR gates are called universal gates? Realize AND and Ex-NOR gates using NOR gates only.

OR

- b. Define the output 'Q' of the logic circuit given below and write the truth table for the same. Also, find the min-terms and max-terms.

