3rd Semester B.Tech. Mid Term Examination 2021-22
DIGITAL ELECTRONICS(BTEC-T-ES-003)

Duration: 01:30   Full Marks: 25

1 *Answer All*

a The minimized form of the logical expression $(A'B'C' + A'BC' + A'BC + ABC')$ is _____.   1

b Determine the values of A, B, C, and D that make the product term $\overline{A}B\overline{C}D$ equal to 1.   1

c   Find the complement of the expression A'B+CD'.   1

d Simplify the following Boolean expression   1

F=AB+A'C+BC

e Implement EX-NOR gate using 4:1 MUX.   1

f Convert decimal numbers 97 and 63.4 to BCD   1

2 *Answer All*

a Find $(1010)_2$-$(1101)_2$ using 2's complement method   3

b Simplify the Boolean function using K-MAP: F =A'B'D'+A'CD+A'BC and   3
d=A'BC'D+ACD+AB'D', where "d" indicates Don't care conditions.

c   Implement F= (A+B)(C+D)(D'+E') using NOR gate only   3

3 *Answer any One*

a Explain how the negative numbers are represented in binary numbering systems with   5
example. Discuss the properties of 2's complement format with example.

b Minimize the following expression using Boolean Algebra and Implement it using NAND   5
gates only.

f=A [B+ C' (AB+AC')']

4 *Answer any One*

a Obtain the minimal sum of products expression for the following function and implement   5
the same using universal gates.

f(A,B,C,D)=Σ(0, 2, 3, 5, 7, 8, 13)+ Σ_d(1,6,12)

b Implement   *F(A, B, C)*=$\sum_m$(1, 2, 6, 7) using 8:1 MUX only, 4:1 MUX only, and 2:1 MUX only.   5