Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Mid Term (Odd) Semester Examination October 2024

Roll no. 2392164

Name of the Course and semester: BCA III
Name of the Paper: Digital Logic Design
Paper Code: TBC 303
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. (10 Marks) CO1

a. Convert the following

I. $(B5D)_{16}$ to $(?)_2$
II. $(100101)_2$ to $(?)_8$
III. $(47)_{10}$ to $(?)_8$
IV. $(473)_8$ to $(?)_2$
V. $(10110101)_2$ to $(?)_{16}$

OR

b. (i) Convert binary number to Gray code.

(a) 1011 (b) 1110

(ii) Convert the decimal number 365 to its BCD equivalent.

Q2. (10 marks) CO2

i. Minimize the following function in SOP minimal form using K-Maps:
$F(A, B, C, D) = m(1, 2, 6, 7, 8, 13, 14, 15) + d(0, 3, 5, 12)$

ii. Using laws of Boolean algebra, prove
$AB+\overline{A}C+BC=AB+\overline{A}C$

OR

b. State and prove the two basic De Morgan's theorems.
Use De Morgan's law on the expression.

$$\overline{\overline{C}\,(\overline{A}+B)}$$

Q3. (10 Marks) CO2

a) What do you mean by logic gates? Explain all the seven types of logic gates with their truth table, Boolean expression and logic diagram.

OR

b. State and verify.

iii. Associative Law
iv. Distributive Law

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Q4. (10 Marks) CO1

a. Calculate the 1's and 2's complement of the number 1011000.
Calculate the 9's and 10's complement of the number 155.

OR

b. Convert the following Non Canonical form into Canonical form.

i. F (A,B,C) = (A+B).(B+C).(A+C)

ii. F(A,B,C,D) = AB+BC+AC

Q5. (10 Marks) CO1 & CO2

a. What is Minterm and Maxterm? Explain.
Determine the mintern expansion for the following Boolean expressions.
F(A,B,C)= A'B'C'+A'BC'+A'BC+ABC

OR

b. Given two binary numbers X = 1010100 and Y = 1000011, perform the subtraction
(a) X-Y and (b) Y-X
by using 2's complement.