

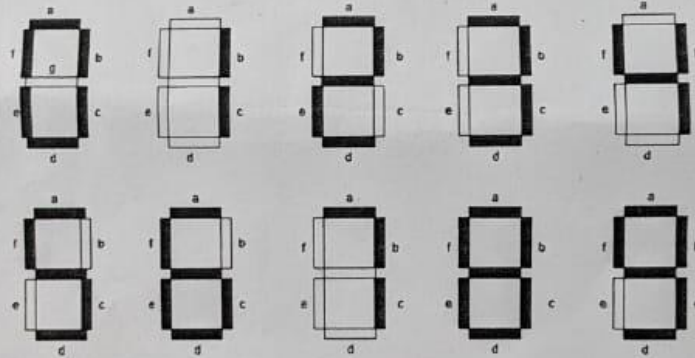


Continuous Assessment Test I- March 2023

Programme : B.Tech CSE	Semester : Winter 2022-23
Course : Digital System Design	Code : BECE102L
Faculty : A. Mohamed Imran	Slot : B1+TB1
	Class Number : CH2022232300550
Time : 1½ Hours	Max. Marks : 50

Answer ALL Questions

1. In a seven segment display as shown below, each of the seven segments are activated for various digits. The input is given in Binary Coded Decimal format.
 - (a) Design a combinational circuit to activate the **segment a**. Find the boolean function in SOP form and implement the circuit using a 3 to 8 line decoder. (8)
 - (b) Obtain the minimal POS expression for **segment e**. Realize the circuit using NOR gate. (8)



2. Design a combinational circuit to compare any two 3-bit numbers and specify if $(A = B)$ or $(A < B)$ or $(A > B)$. (8)
3. Design a logical circuit that generates the 2's complement of a given 3 bit binary number. Let A, B, C be the inputs and X, Y, Z be the outputs. (8)
 - (a) Simplify the boolean function X using boolean algebra
 - (b) Implement the function Z using 4×1 multiplexer. Use A, B as selection lines.
4. The 8×1 multiplexer has inputs A, B and C connected to the selection inputs S2, S1 and S0 respectively. The data inputs I0 through I7 are as follows: (8)

$$I2 = 0; I0 = I1 = I3 = 1; I4 = I6 = I7 = D; I5 = \bar{D}$$

Form the truth table and identify the boolean function that the multiplexer implements.

5. Compute the output of a 4-bit Booth multiplier taking $A = 6$ as the multiplicand and $B = -6$ as the multiplier. (10)