OR

(b) Convert the following Boolean expression into Standard or Canonical POS form : 10 (CO2)

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

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

$(B' + C + D')(A + B' + C' + D)$

5. (a) (i) Find the min-term expression of : 5 (CO2)

$F(A, B, C) = AB + BC' + AC'$

(ii) Find the standard product of sum (POS) for the logic expression : 5 (CO2)

$F = (A + B'C)\,C$

OR

(b) What is parity ? If received Hamming code is 1001111 with even parity, then detect and correct error. 10 (CO1)

H Roll No. .....

TBC–205/TBI–205

B. C. A./B. SC. (IT)

(SECOND SEMESTER)

MID SEMESTER

EXAMINATION, April, 2023

DIGITAL ELECTRONICS

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Convert the following : 10 (CO1)

(i) $(13.84)_{10}$ to $(?)_8$

(ii) $(2AD)_{16}$ to $(?)_{10}$

(iii) $(A69.8)_{16}$ to $(?)_{10}$

(iv) $(423)_{10}$ to $(?)_{BCD}$

(v) $(81)_{10}$ to $(?)_{XS\text{-}3}$

P. T. O.

OR

(b) (i) Perform the following subtractions using complement method : 5 (CO1)

(1) $(01000)_2 - (01001)_2$

(2) $(45)_{10} - (57)_{10}$

(ii) Explain gray code and excess 3 code. Represent the decimal number 26 in binary form using : 5 (CO1)

(1) BCD Code

(2) Excess-3 Code

2. (a) (i) Simplify the following Boolean function using K-map : 5 (CO2)

$F(P, Q, R, S) = \Sigma (0, 2, 5, 7, 8, 10, 13, 15)$

(ii) Simplify the following Boolean function : 5 (CO2)

$XY + X'Y'Z' + X'YZ'$

OR

(b) What is De Morgan's law ? Apply De Morgan's theorem in the following : 10 (CO2)

$[(A + B + C) D]'$

3. (a) Draw the following logic gates with their expression and truth tables : 10 (CO2)

(i) AND

(ii) X-NOR

(iii) X-OR

(iv) NOR

What are Universal Gates ? Explain.

OR

(b) Realize the following logic operations using only NAND gates : 10 (CO2)

AND, OR, NOT

4. (a) Explain the following arithmetic circuits with proper truth table, logic diagram, logic expression and logic symbols : 10 (CO2)

(i) Half Adder

(ii) Full Adder

(iii) Half Subtractor