

Mid Assignment – 1

Course: Digital Logic Design (CSE 1325)

Section: K

Submission Guideline

- Solve every question on your own. Copying will result in zero marks.
- **Deadline: 8th September 2024**
- You must submit soft copy of the assignment.

Answer All Questions

1. A) Considerable evidence suggests that base 20 has historically been used for number systems in a number of cultures (use an extension of the same digit representation scheme employed for hexadecimal). [2]

(i) Convert $(BCI.G)_{20}$ to decimal.

(ii) Convert $(2024)_{10}$ to base 20.

- B) Imagine the following calculation was performed by a particular breed of unusually intelligent chicken. If the radix r used by the chicken corresponds to its total number of toes, is it possible to have a chicken like this? If yes then how many toes does the chicken have on each foot? [3]

$$((34)_r + (24)_r) \times (21)_r = (480)_r$$

2. A) Prove the identity of the given Boolean equation using algebraic manipulation: [2]

$$WXY' + XY'Z' + XY + Y'Z = X + Y'Z$$

- B) Convert the following expression into both canonical SoP(SOM) and canonical PoS (POM) forms using Boolean algebra : [3]

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

3. Find the product-of-sum (POS) form for the following function using K-map: [4]

$$F(A, B, C, D) = \prod_m(1,2,3,4,9,12) + \sum_d(5,13,14,15)$$

4. For the following function: (i) Find all the Prime implicants, (ii) Find all the essential prime implicants and (iii) Find a simplified expression in Sum of Product (SOP) using the selection rule. [5]

$$F(A, B, C, D) = \sum_m(0,1,7,14) + \sum_d(5,8,10,15)$$