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Course Code: MCA-101

Course Name: Fundamentals of IT

**Assignment 1**  
(Based on Unit-I & II)

- Q1. Simplify the given Boolean function in product-of-sums form by means of a four-variable map,  $F(w, x, y, z) = \Pi(0, 1, 5, 6, 7, 11, 12, 13)$
- Q2. Draw the logic diagram with (a) OR-AND gates; (b) NOR gates.  
 $F(w, x, y, z) = \Pi(2, 3, 4, 5, 6, 7, 11, 14, 15)$
- Q3. Given the Boolean function  $F(x,y,z) = xy' + z'y'z + xyz$
- Use the truth table of the function.
  - Draw the logic diagram using NAND gates.
- Q4. Design a 4-bit combinational circuit decremter using four full-adder circuits. Also draw the truth table for the same.
- Q5. Show that the exclusive OR function  $x = A \oplus B \oplus C \oplus D$  is an odd function.
- Q6. Derive the circuits for a 3-bit parity generator and 4-bit parity checker using an even-parity bit.
- Q7. Perform the following operations using r's complement:
- $(-638) + (+785)$
  - $(-638) - (+185)$
- Q8. A Co-operating bank xyz granted loan under following conditions.
- If a customer has an account with the bank and has no loan outstanding (no dues), loan will be granted.
  - If a customer has an account is outstanding from previous loan, loan will be granted if special management approval is obtained.
  - Reject loan application in all other cases.
- Draw decision table and tree for this case study.
- Q9. Draw a Decision table for transferring money online to an account based on following conditions.  
Money transfer is done successfully only when Account number is valid, OTP matched and there is sufficient money in the account. If there is not sufficient money, show an error message. And if OTP doesn't match, block the transaction and show message "Suspicious transaction".