



PBL-003-1271003

Seat No. _____

M. Sc. (ECI) (Sem. I) Examination

November / December - 2018

Fundamentals of Digital Electronics : Paper - 3

Faculty Code : 003

Subject Code : 1271003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- 1 Answer the following : (any 7 out of 10) 14
- (1) Convert $(110101)_2$ into Decimal.
 - (2) Convert $(172.89)_{10}$ into Hexadecmial.
 - (3) Convert $(8AB2)_{16}$ into Octal Number system.
 - (4) Convert $(FCA3)_{16}$ into Gray code.
 - (5) Classify Digital logic family based on fabrication.
 - (6) Explain 2 input EX-NOR gate with its symbol and truth table.
 - (7) Explain commutative law for Boolean expression.
 - (8) Write the complement form for the Boolean expression $\overline{A.B} + \overline{A.C} + A.C$
 - (9) Find the 9's and 10's complement of $(8324.3)_{10}$.
 - (10) Find the 1's and 2's complement of $(1101010)_2$.
- 2 Answer the following : (any 2 out of 3) 14
- (1) Explain BASIC gates with symbols, Boolean expressions and Truth tables. 7
 - (2) List the advantages of Digital Integrated Circuits (ICs) 7
 - (3) For the Boolean expression 7
$$F(A, B, C) = \overline{A} \overline{B} \overline{C} + \overline{A} \overline{B} C + \overline{A} B C + A B C$$
Write its minterm and maxterm and reduce the expression using various laws of Boolean algebra and draw its circuit.

- 3 Answer the following : 14
- (a) Do the arithmetic operation using 2's complement method.
- (1) $(+32)_{10} + (-12)_{10}$
(2) $(-20)_{10} - (+30)_{10}$
- (b) Divide $(110111)_2$ by $(1010)_2$ using repeated right shift and subtract algorithm. Explain each step in detail.

OR

- 3 Answer the following : 14
- (a) A mobile shop has seven segment display which shows "OPPO 5L8"
Generate code for each display.
(Consider common cathode type display)
- (b) Test the Hamming code sequence 1111011. AND show how to correct it, if there is an error.

- 4 Answer the following : 14
- (a) Explain NOR gate as a Universal gate.
- (b) Explain Half adder circuit with truth table, expression and Logical circuit.

- 5 Answer the following : (any 2 out of 4) 14
- (1) Explain DeMorgan's theorem in detail. Write formulas, symbols and example.
- (2) Perform following in 8421 BCD using Ex-3 code.
- (1) $138 + 234$
(2) $75 - 39$
- (3) Simplify following Boolean expression using K-Map.
 $f(A, B, C, D) = \sum (0, 3, 4, 7, 8, 11, 12, 15)$ AND draw the logic circuit.
- (4) Write the name of Boolean Theorem
- (1) $X + X = X$
(2) $X + Y = Y + X$
(3) $(X')' = X$
(4) $(X + Y)' = X' \cdot Y'$
(5) $X + X' = 1$
(6) $X + (Y + Z) = Y + (Z + X) = Z + (X + Y)$
(7) $X + X \cdot Y = X$