



**HDG-003-1271003**

Seat No. \_\_\_\_\_

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

November / December – 2017

**Fundamentals of Digital Electronics : Paper - III**

**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

- (a) Classify Digital logic family based on fabrication.  
(b) Find the FAN OUT of digital gate with following specifications.

$$I_{OH} = 0.4 \text{ mA} \qquad I_{IH} = 0.02 \text{ mA}$$

$$I_{OL} = 8 \text{ mA} \qquad I_{IL} = 0.4 \text{ mA}$$

- (c) Write the name of Boolean theorem

(1)  $\overline{\overline{X}} = X$

(2)  $\overline{X + Y} = \overline{X} - \overline{Y}$

- (d) Convert  $(AB6.29)_{16}$  into Octal number system.

- (e) Find Binary equivalent of  $(79.30)_{10}$ .

- (f) Convert  $(58DE)_{16}$  into equivalent Gray code.

- (g) Convert  $(156.20)_8$  into Decimal number system.

- (h) Test the Hamming code sequence 1111011.

Correct it, if there is any error.

- (i) Explain 2 input AND gate with its symbols and truth table.

- (j) Do using 2's complement method.

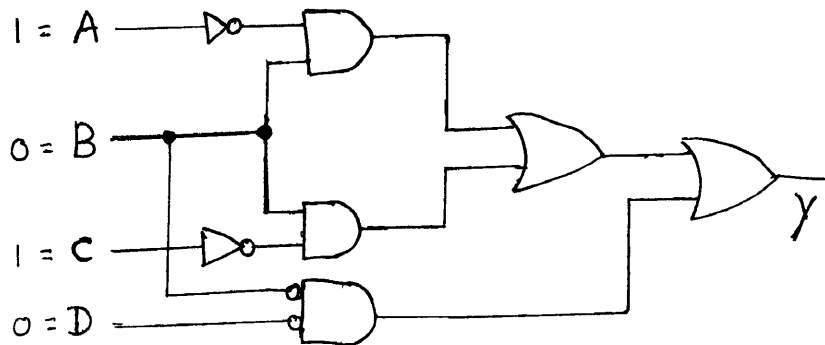
$$(+18)_{10} - (-10)_{10}$$

- 2** Answer the following : (any 2 out of 3 from, (a), (b) and (c)) : **14**
- (a) Explain NOR gate as a Universal gate. **5**
- (b) List the advantages of Digital Integrated Circuits (ICs). **5**
- (c) Write the following forms for the Boolean expression.  
 $f(A, B, C) = A\bar{B} + \bar{B}\bar{C} + AC$
- (1) Dual form
- (2) Complemented form
- (3) Canonical form
- (d) Compulsory question : **4**  
 Explain OR gate and NOT with their symbols and truth tables.
- 3** Answer the following : **14**
- (a) Design 2 input Ex-OR gate using only 2 input NAND gates. Explain in detail.
- (b) Explain Minterms and Maxterms for following Boolean expression.  
 $f(A, B, C, D) = \pi(0, 4, 5, 11, 13, 15)$
- OR**
- 3** Answer the following : **14**
- (a) Make a seven segment display for Football match which shows "FIFA 2018" Generate code for each display.  
 (Consider common cathode type display)
- (b) Multiply  $(14)_{10}$  and  $(12)_{10}$  using 4 bit repeated add and shift right algorithm. Explain each step in detail.
- 4** Answer the following : **14**
- (a) Simplify following Boolean expression using K-map.  
 $f(A, B, C, D) = \sum(0, 3, 4, 7, 8, 11, 12, 15)$   
 Draw the logic circuit.
- (b) Perform following in 8421 BCD using Ex-3 code.
- (1)  $136 + 180$
- (2)  $78 - 59$

5 Answer the following : (any 2 out of 4)

14

- (1) Explain Half adder circuit with truth table, expression and Logical circuit.
- (2) Explain DeMorgan's theorem in detail. Write formulas, symbols and example.
- (3) What will be the output of a given digital circuit ? Explain output for each gate.



- (4) For following logic circuit, Identify the expression of the output and write the function of this circuit.

