**Bachelor of Science (B.Sc.) Semester–I Examination**

**ELECTRONICS (Fundamentals of Digital Electronics)**

**Optional Paper–2**

Time : Three Hours] [Maximum Marks : 50

**Note :—**(1) **ALL** questions carry equal marks in indicated.

(2) Due credit will be given to neatness and adequate dimensions.

(3) Assume suitable data wherever necessary.

(4) Diagram should be given wherever necessary.

1. **EITHER**

(A) Explain how decimal numbers are converted to their binary equivalent with the help of examples. Explain 1's and 2's complement method for binary substraction with suitable example. 4+6

**OR**

(B) Describe the methods for representing signed binary numbers. Give examples. Convert as directed.

(i) $(189)_{10}$ into BCD code

(ii) Write Xs-3 code for $(376)_{10}$

(iii) (1110110) Gray code to Binary.

(iv) $(4AF)_{16} = (?)_8$

(v) $(39.75)_{10} = (?)_2$. 5+5

2. **EITHER**

(A) Explain X -OR and X - NOR gates with the help of logic symbols, equations and truth table. State and prove De Morgan's theorem. 6+4

**OR**

(B) Draw the logic circuit of X-OR gate using NAND gate & explain. Draw the logic diagram of construction of basic logic gates using NAND and NOR gates. 4+6

3. **EITHER**

(A) What is K-map ? Explain formation of pairs, quads and octet in k-map. Simplify using K-maps. $F(ABCD) = \sum m(0, 3, 5, 6, 9, 10, 12, 15)$. 1+4+5

**OR**

(B) Explain what are standard SOP and POS form of Boolean equation with examples. Design binary to grey code converter using K-map. 4+6

4. **EITHER**

(A) Give the difference between Multiplexer and Demultiplexer. Draw and explain working of 4 : 1 mux. Write the advantages of the mux. 6+4

**OR**

(B) Explain the working of 4-bit binary adder/substractor circuit. What is demultiplexer ? Explain 1:4 demultiplexer. 6+1+3

5. Solve any **ten** :

(i) What is the radix of hexadecimal number system ?

(ii) Substract (6) from (15) using 2's complement.

(iii) What is positive logic ?

(iv) State duality theorem.

(v) Write the truth table of Ex-NOR gate.

(vi) Draw Half Adder circuit.

(vii) Draw K-map for two variables.

(viii) What is POS ?

(ix) What is decoder ?

(x) How many select lines are required for 32 input multiplexer ?

(xi) Draw seven segment display for 0011 and 1000.

(xii) What is RAM ? 1×10=10