Total number of printed pages–3

53 (IT 303) DGLG

2021

DIGITAL LOGIC DESIGN

Paper : IT 303

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Convert the following: 2×5=10

   (i) $(186)_{10} = (?)_8$

   (ii) $(1111{\cdot}01)_2 = (?)_{10}$

   (iii) $(12FBA)_{16} = (?)_2$

   (iv) $(21{\cdot}8)_8 = (?)_{10}$

   (v) $(011110111011010)_2 = (?)_{16}$

Contd.

(b) Verify the following using truth table method : 10

(i) $\left(\overline{AB + \overline{B} + \overline{AB}}\right) = 0$

(ii) $(\overline{A} + B)(A + \overline{B}) = AB + \overline{A}\,\overline{B}$

2. (a) Expand $(\overline{A} + \overline{B})$ to Minterm and Maxterms. 10

(b) State and prove both the laws of De Morgan's theorem. 10

3. Using K-map, simplify the following functions : 5×4=20

(i) $F(A, B, C) = \sum m(5, 7, 2, 3)$

(ii) $F(A, B, C, D) = \sum m(0, 2, 5, 9, 15) + d(6, 3, 10, 13)$

(iii) $F(A, B, C, D) = \Pi M(2, 3, 9, 10, 11)$

(iv) $F(A, B, C, D) = \sum m(4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)$

4. (a) Draw the logic circuit of the Boolean functions given below using basic gates : 5+5=10

(i) $Y = \overline{a}b\overline{c} + c\overline{d}$

(ii) $Y = a + \overline{ab} + (a + \overline{b})cd$

(b) Explain the full-adder circuit with the help of function table. 10

5. Explain various types of flip-flop in details with the help of diagrams. 20

6. (a) Explain 4 : 1 multiplexer and 1 : 4 Demultiplexer in details. 10

(b) Explain 8×3 Encoder and 3×8 Decoder in details. 10

7. Write short notes on: ***(any four)*** 5×4=20

(a) Universal Gates

(b) Minterm and Maxterm

(c) SOP and POS form

(d) Sequential and Combinational circuit

(e) RAM and ROM

(f) Primary and Secondary memory.