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52 (2) ITB-HC-2026

2024

DIGITAL LOGIC

Paper : ITB-HC-2026

Full Marks : 80

Time : Three hours

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

Answer **any eight** questions.

1. (a) Convert $(128)_{10}$ to binary number. 2
- (b) Convert (1001010) to decimal number. 2
- (c) Define De Morgan theorem. 2
- (d) Draw the logic diagram of Boolean function $F = AB'C + AB'C'$. 2
- (e) What do you mean by flip-flop? 2

Contd.

2. (a) Obtain the truth table of the Boolean function
 $F = A'BC + ABC + A'BC'$ 5
 (b) Briefly explain the T-flip-flop with diagram. 5
3. Simply the Boolean functions using K-map :
 $5+5=10$
 (a) $f(A, B, C, D) = \sum (0, 1, 2, 5, 7, 8, 10, 11)$
 (b) $f(A, B, C, D) = \sum (0, 2, 4, 6, 14, 15)$
4. (a) Briefly explain the full adder with diagram and truth table. 5
 (b) Briefly explain the Johnson Counter. 5
5. (a) Briefly explain the De-Multiplexer with diagram. 5
 (b) What do you mean by level triggering and edge triggering? 5
6. (a) Briefly explain the J-K flip-flop. 5
 (b) Briefly explain the Ripple Counter. 5
7. (a) Find the complement of the Boolean function : $F = x(y'z' + yz)$ 5
 (b) Briefly explain the BCD counter. 5
8. Explain the combinational circuit encoder with diagram and truth table. 10
9. Explain the combinational circuit decoder with diagram and truth table. 10
10. Briefly explain the shift register with proper diagram. 10
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