

(3 Hours)

[Total Marks: 80]

N.B.: (1) Question No. 1 is **Compulsory**.(2) Attempt any **three** questions out of the remaining **five**.

(3) Each question carries 20 marks and sub-question carry equal marks.

(4) Assume suitable data if required.

1. (a) Convert the given Gray number 10110010 into
  - i) Binary (5)
  - ii) Hex
  - iii) Octal
  - iv) Decimal
- (b) A) Multiply  $(1011.101)_2$  by  $(101.01)_2$  (5)  
 B) Subtract 14 from 25 using 2's Complement.
- (c) What is Race-around condition in JK flip-flop? Discuss the technique to overcome this condition. (5)
- (d) Differentiate between analog and digital systems. (5)
2. (a) Explain MSI Shift registers (74194) and their applications (10)
- (b) Design and implement 2 bit magnitude comparator. (10)
3. (a) Explain conversion of JK flip-flop to D flip-flop in detail. (10)
- (b) Explain SR Flip-Flop with neat diagram, working, Truth table, characteristic table and excitation table (10)
4. (a) Implement following function using PAL.  $F = \sum m = (0,3,4,7)$  and  $F_2 = \sum m = (1,2,5,7)$ . (10)
- (b) Differentiate between Moore and Mealy Circuit. (10)
- 5 (a) What is Twisted ring counter? How it works? (10)
- (b) Write a code in VHDL to implement 4:1 MUX. (10)
6. (a) Design 4:16 Decoder using two 74138 ICs. (10)
- (b) Design non-overlapping mealy sequence detector for sequence 1101. (10)