

(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
 - i) $(9DB2)_{16}$ into binary. (5)
 - ii) $(67.4A)_{16}$ into octal. (5)
 - iii) $(37)_{10}$ to XS-3 (5)
 - iv) $(4C8.2)_{16}$ into Decimal (5)
 - v) (1101) Gray to Binary (5)
- (b) Implement Full adder using 8 :1 Multiplexer. (5)
- (c) Design 2:1 Mux using IC 74153 (5)
- (d) Explain full subtractor with truth table, k-map and logic diagram (5)
2. (a) Design and implement 7490 Pin diagram and as decade counter (10)
- (b) Differentiate between Mealy and Moore machine (10)
3. (a) Implement the following function using PAL. $F = \sum m = (0, 3, 4, 7)$ and $F2 = \sum m = (1, 2, 5, 7)$ (10)
- (b) Implement Full Adder using PLA circuit. (10)
4. (a) Compare CPLD and FPGA devices. (10)
- (b) Implement and explain 4-bit BCD adder using IC 7483. (10)
5. (a) Solve using K-map and implement same using logic gates
 $f(ABCD) = \sum m (4, 5, 7, 12, 14, 15) + \sum d (3, 8, 10)$ (10)
- (b) Reduce using Boolean Algebra Rules $(x'yz + xy'z + xyz + xyz')$ and realize using AOI logic (10)
6. (a) Explain working of IC 74194 design it as ring counter (10)
- (b) Design MOD 6 counter using MOD 8 counter. (10)