

Part-B (5 X 4 = 20 marks)

Answer ANY FIVE Questions

21. Design a JK flip flop that behaves like a T flip flop.
22. Explain Programmable Read-Only Memory (PROM) in detail.
23. State Reed-Muller expansion theorem and mention its significance.
24. What is CPLD? List out its advantages and disadvantages.
25. Design a 4 bit Gray to Binary code convertor.
26. Simplify the following Boolean expression using De-Morgan's Theorem

$$\overline{(\overline{A}B + \overline{A}B)}(A + B)$$

27. Obtain reduced state diagram for the following state table (refer Table.1)

Present State	Next State		Output	
	X = 0	X = 1	X = 0	X = 1
A	B	C	1	0
B	F	D	0	0
C	D	E	1	1
D	F	E	0	1
E	A	D	0	0
F	B	C	1	0

Table.1

Part-C (5X 12 = 60 marks)

Answer ALL Questions

28. (a) Implement the following expression using Shannon's Expansion Technique

$$F(w, x, y, z) = w\overline{x} + \overline{x}\overline{y} + w\overline{z} + \overline{x}z$$

(OR)

(b) Explain the types of hazards in combinational logic circuits. Also elaborate the ways in which hazards are detected and eliminated in a circuit.

29. (a) Design a Mod 8 sequential counter using D flip-flop

(OR)

(b) Analyze the behavior of circuit (fig.1) using state table and state diagram.

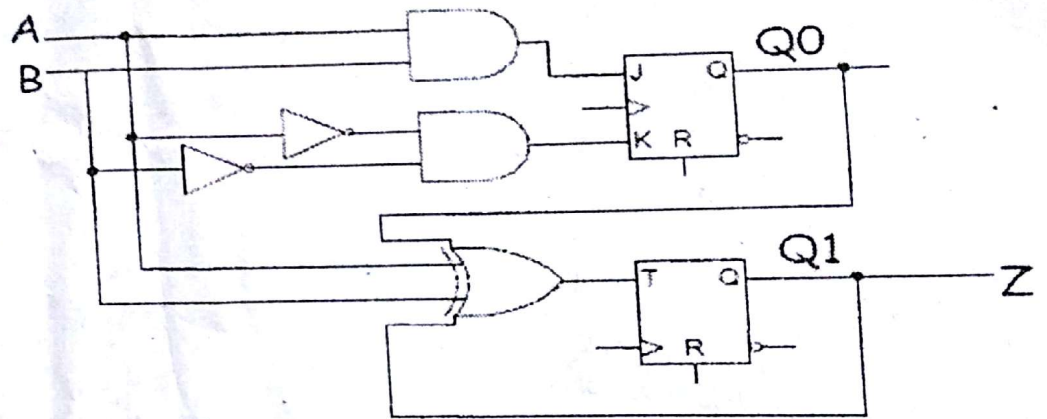


fig.1

30. (a) A Boolean function is defined by the truth table as shown in Table.2. Implement the corresponding circuit with Programmable Logic Array (PLA) having three inputs, three product terms and two outputs.

A	B	C	F ₁	F ₂
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	0
1	0	1	1	1
1	1	0	0	1
1	1	1	1	1

Table.2

(OR)

(b) Draw the architecture of Xilinx 4000 series FPGA and explain its Configurable Logic Block (CLB) in detail.

31. (a) With suitable example, explain the design and operation of a Moore sequential machine

(OR)

(b) (i) Explain the concept of incompletely specified machines with an example. (10)

(ii) Draw the logic diagram and truth table of SR flip flop (02)

32. (a) Implement the following multiple output logic functions

$$w(A, B, C, D) = \sum(2, 12, 13)$$

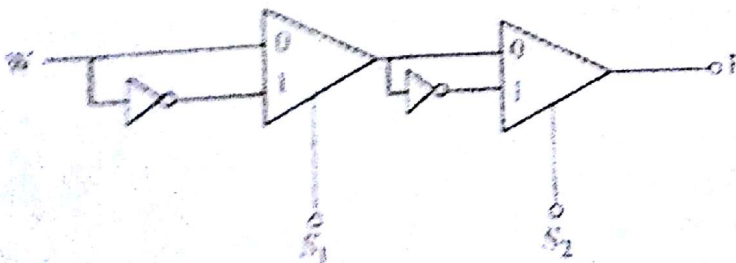
$$x(A, B, C, D) = \sum(7, 8, 9, 10, 11, 12, 13, 14, 15)$$

$$y(A, B, C, D) = \sum(0, 2, 3, 4, 5, 6, 7, 8, 10, 11, 15)$$

$$z(A, B, C, D) = \sum(1, 2, 8, 12, 13)$$

(OR)

(b) (i) Find the Boolean function realized by the following circuit and show its truth table



(4)

(4)

(ii) State and prove consensus Theorem.

(iii) Prove $A'B + A'B'C'D' + ABCD' = B(A' + CD')$ (4)