

Department of Electronics and Communication Engineering

National Institute of Technology, Srinagar

Examination: Major
Subject: Digital Electronics
Date: 23rd - June 2016

Semester: 4th (IT)
Max Marks: 50
Time allotted: 2hrs

Note: Attempt any four questions.

Q1. i) Minimize using Boolean algebra:

$$Y = (A + B)(A + \bar{A}B)C + \bar{A}(B + C) + \bar{A}B + ABC$$

ii) Minimize using K-map: $A(A + \bar{A} + B)$

$$f(A, B, C, D) = \sum m(0, 3, 4, 5, 7) + d(8, 9, 10, 11, 12, 13, 14, 15)$$

iii) Consider 0010001 is received at receiver end. The receiver does not know what was transmitted. Find any error that occurred during transmission if even parity is used.

Q2. i) Define and explain with example the following:

- Canonical and Standard Expression
- Minterm and Maxterm

ii) Draw and explain logic diagram of look-ahead carry generator.

Q3. i) Differentiate between Combinational and Sequential circuits.

ii) Draw the schematic diagram of J-K flip flop. Obtain the characteristics, excitation tables and write down its truth table.

iii) State the disadvantage of SR flip flop. How can they be avoided?

Q4. i) What is VHDL? What are the three main parts of VHDL code?

ii) Implement the following function with a multiplexer (Use selector BCD)

$$f(A, B, C, D) = \sum m(0, 2, 3, 6, 8, 9, 11, 12, 14)$$

iii) Implement the following function using a 4 to 16 line decoder:

$$f = \sum m(1, 2, 4, 7, 8, 11, 12, 13)$$

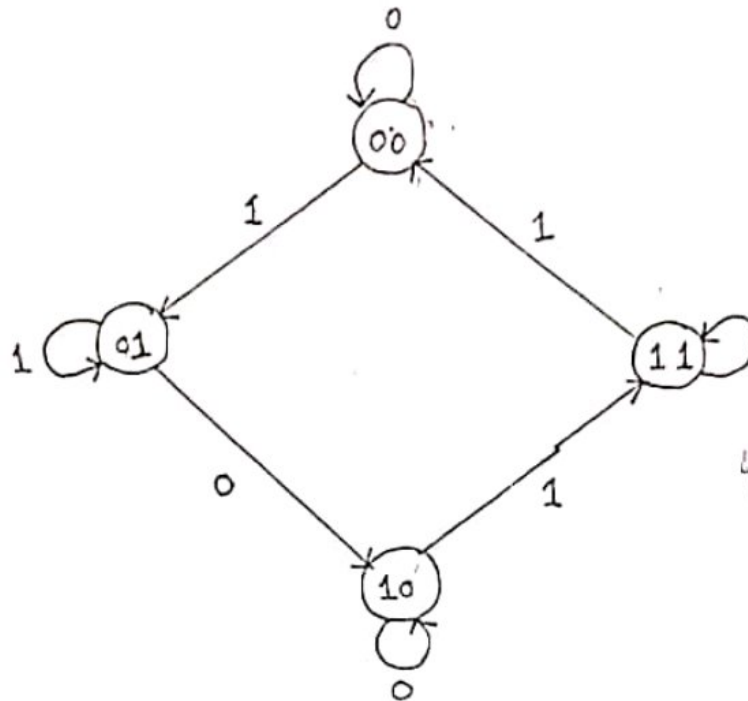
Q ← 101
I ← 111
011
100

Q5. i) What is a Counter? Explain the working of a Ring Counter.

(4.5)

ii) Design a Sequential circuit whose state diagram is given (Use JK-FF)

(8)



S.T	S.I	P.S	N.S
AB	AB	AB	AB
00	00	00	00
01	00	00	01
10	10	10	01
11	11	11	11

AB	K	A'	B'	J.A.
00	0	0	0	
01	1	0	0	
10	1	0	1	
11	0	1	1	



AB	AB	AB	AB
00	00	00	00
01	00	00	01
10	10	10	01
11	11	11	11

Res	Input	Output	State
00	00	00	00
00	01	00	01
00	10	00	10
00	11	00	11
01	00	01	00
01	01	01	01
01	10	01	10
01	11	01	11
10	00	10	00
10	01	10	01
10	10	10	10
10	11	10	11
11	00	11	00
11	01	11	01
11	10	11	10
11	11	11	11

