

# Tribhuvan University

Faculty of Humanities and Social Sciences

OFFICE OF THE DEAN

2018

BCA First Semester

Subject: Digital Logic

Time: 3hr

Full Marks:60

Pass Marks: 24

## Group B

Attempt any SIX questions. [6x5=30]

11. Subtract:  $675.6 - 456.4$  using both 10's and 9's complement. [5]
12. What is universal logic gate? Realize NAND and NOR as an universal logic gates. [1+2+2]
13. Simplify (using K- map) the given Boolean function F in both SOP and POS using don't care conditions D:  $B'CD' + A'BC'D$   $F=B'C'D' + BCD' + ABCD'$  [2+3]
14. Define encoder: Draw logic diagram and truth table of octal - to - binary encoder. [1 + 4]
15. What is D flip-flop? Explain clocked RS flip-flop with its logic diagram and truth table. [1+4]
16. Design MOD - 5 counter with state and timing diagram. [2+1+2]
17. Design a 4 - bit serial into parallel- out shift register with timing diagram. [3+2]

## Group C

Attempt any TWO questions. [2x10=20]

18. Write difference between PLA and PAL. Design a PLA circuit with given functions.

$$F1(A, B, C) = \Sigma(2, 3, 5)$$

$$F2(A, B, C) = \Sigma(0, 4, 5, 7).$$

Design PLA program table also. [3+7]

19. Define D flip-flop. Design a Master-slave flip-flop by using JK flip-flop along with its circuit diagram and truth table. [2+8]
20. Write down the difference between asynchronous and synchronous counter. Design a 4-bit binary ripple counter along with its circuit, state and timing diagram. [3+7]

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2019

BCA First Semester

Subject: Digital Logic

Time: 3hr

Full Marks:60

Pass Marks: 24

## Group B

Attempt any Six question

2. Subtract:  $1010.110 - 101.101$  using both 2's and 1's complement.
3. Simplify (using k-map) the given Boolean unction in both SOP and POS using the don't case condition d:  $f(A,B,C,D)=\pi(0,1,3,7,8,12) \pi d (5,10,13,14)$
4. Define decoder. Draw logic diagram and truth table of 3 to 8-line decoder.
5. Define ROM. Implement the following combinational logic function using ROM:

A1	A0	F1	F2
0	0	1	0
0	1	0	1
1	0	1	1
1	1	1	0

6. What are the drawbacks of clocked RS Flip Flop? Explain the operation of JK Flipflop along with its circuit diagram and characteristic table.
7. What is T-Flip Flop? Explain clocked JK Flip-Flop with its logic diagram and truth table.
8. Design MOD-7 counter with state and timing diagram

## Group C

Attempt any Two question

9. Define PLA. Design PLA circuit with given funtion.

$$F1(A,B,C)=\Sigma (3,5,6,7)$$

$$F2(A,B,C)=\Sigma (0,2,4,7).$$

Design PLA Program table also

10. Distinguish between sequential and combinational logic with example? Discuss the design procedure of combinational logic.

11. A sequential circuit with two D flip flops, A and B, two inputs x and y, and one output z, is specified by the following next state and output equations.

$$A(t + 1) = x'y + xA$$

$$B(t + 1) = x/B + xA$$

$$z = B$$

- a) Draw the logic diagram.
- b) Derive the state table.
- c) Derive the state diagram.

# Tribhuvan University

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2020

BCA First Semester

Subject: Digital Logic

Full Marks:60

Time: 3hr

Pass Marks: 24

## Group B

Attempt any SIX questions. [6x5 = 30]

2. Define Digital Logic. Explain digital signal with its applications, advantages and disadvantages. [1 + 4]
3. Define positional number System [1] calculate following: [2+2]
  - a) Subtract 21 from 35 using 2's complement method. b) Convert  $(62.75)_{10}$  into single precision floating point format [2]
4. Define universal gate. Explain Universal gates with their graphical symbol, algebraic expression, truth table, and Venn diagram [1 + 4]
5. Define Decoder. Explain binary to octal converter with block diagram, truth table and logic diagram[1 + 4]
6. Simplify the Boolean function  $F(w,x,y,z) = \pi(0,2,4,6,8,10,12,14)$  and don't care conditions  $d(w,x,y,z) = \pi(1,3,9,11)$  using K-Map method for both SOP and POS form [2.5 + 2.5]
7. Define Multiplexer. Explain 4:1 multiplexer with its block diagram, truth table and logic diagram [1 + 4]
8. Write short Notes on (any Two): [2.5 + 2.5]
  - a) Parallel Adder b) PLA c) State Diagram

## Group C

Attempt any TWO Questions

9. Explain JK and T FlipFlop with their Logic and Diagram, graphical symbol, characteristic table, characteristic equation and excitation table. [5 + 5]
10. Differentiate between asynchronous and synchronous sequential circuits with example. Draw a block diagram, truth table and timing diagram to store 2001 in 4-bit SIPO register. [4 + 6]
11. Define counter. Write a procedure to design a counter circuit. Design MOD-8 up counter [1 + 2 + 7]