



Tribhuvan University
Faculty of Humanities & Social Sciences
OFFICE OF THE DEAN 2019

Bachelor in Computer Applications
Course Title: Digital Logic
Code No: CACS 105
Semester: 1st

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Centre:

Symbol No:

Candidates are required to answer the questions in their own words as far as possible.

Group A

Attempt all the questions.

[10×1 = 10]

1. Circle (O) the correct answer.

- i) Which one of the following is hexadecimal equivalent of $(5073.052)_8$?
 - a) A3C.150
 - b) B2B.140
 - c) A3B.150
 - d) B3A.150
- ii) Which one of the following is 9's complement of $(3578.501)_{10}$?
 - a) 4926.947
 - b) 3926.947
 - c) 4926.937
 - d) None of the Above
- iii) Which one of the following is the equivalent reflected code of 1101?
 - a) 1001
 - b) 1011
 - c) 1000
 - d) 1010
- iv) When output will go high in NOR Gate?
 - a) if all inputs are high
 - b) if any input is high
 - c) if any input is low
 - d) if all inputs are low
- v) According to Boolean algebra: What is the value of $+ 1 = ?$
 - a)
 - b) 1
 - c) 0
 - d)
- vi) The logic circuits whose outputs at any instant of time depends only on the present input But also on the past outputs are called
 - a) Combinational circuits
 - b) Sequential circuits
 - c) Latches
 - d) Flip-flops

- vii) If $Q = 1$, the output is said to be
- a) Reset
 - b) Set
 - c) Previous state
 - d) current state
- viii) Which one of the following are also called ripple counters?
- a) SSI counters
 - b) Synchronous counters
 - c) Asynchronous counters
 - d) VLSI counters
- ix) How many flip-flops are required to construct MOD-30 counter?
- a) 5
 - b) 6
 - c) 4
 - d) 8
- x) How much storage capacity does each stage in a shift register represent?
- a) One bit
 - b) Two bits
 - c) Four bits
 - d) Eight bits



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Group B

Attempt any SIX questions.

[6×5 = 30]

2. Subtract: $1010.110 - 101.101$ using both 2's and 1's complement. [5]
3. Simplify (Using k-map) the given Boolean function in both SOP and POS using the don't care condition d:
[2+3]
4. Define decoder. Draw logic diagram and truth table of 3 to 8-line decoder. [1+4]
5. Define ROM. Implement the following combinational logic function using ROM: [2+3]

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 Flip flop along with its circuit diagram and characteristic table. [2+3]
7. What is T flip-flop? Explain clocked JK flip-flop with its logic diagram and truth table. [1+4]

8. Design MOD - 7 counter with state and timing diagram.

[2+1+2]

Group C

Attempt any TWO questions.

[2×10 = 20]

9. Define PLA. Design a PLA circuit with given functions.

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

$$F2 (A, B, C) = \Sigma (0, 2, 4, 7). \text{ Design PLA program table also.}$$

[3+7]

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

Design procedure of combinational logic.

[4+6]

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

[4+3+3]

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

$$B(t +1) = x'B + x A$$

$$z = B$$

- Draw the logic diagram.
- Derive the state table.
- Derive the state diagram.