

CTEVT, DIPLOMA

Question Bank

Of

(Logic Circuits) or (Digital Logic)

2072 To 2080

Website:- www.arjun00.com.np

**Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur**

Regular/ Back Exam 2072, Bhadra/Ashwin

**Program : Diploma in Computer Engineering Full Marks: 80
(New Course)**

Year/ Part : I/II Pass Marks: 32

Subject : Logic Circuits Time: 3 hrs.

Candidates are required to give their answers as far as practicable. The figures in the margin are for guidance only.



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Attempt (Any Eight) Questions.

1. Explain the importance of digital signal over analog signal with examples. [10]
2. (a) Discuss about the different number system in brief. [5]
(b) Convert $(AB.52)_{16}$ into Octal number. [5]
3. What is BCD code? Write on the alpha numeric code. [5+5=10]
4. Why NAND and NOR gates are called universal gates? Realize the basic logical gate using NAND gate. [4+6=10]
5. What is K-map? Explain sum of product and product of sum simplification. [4+3+3=10]
6. Design a decimal to BCD decoder with diagram. [10]
7. What is multiplexing? Design 8:1 multiplex with neat sketch diagram. [2+8=10]
8. Define the term "flip-flop". Explain different types of flip-flop in brief. [2+8=10]
9. Write short notes on: (Any Two) [2x5=10]
 - a) SISO shift register
 - b) Decade counter
 - c) LED display
 - d) 2's complement method.

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2073 Bhadra/Ashwin

Program: Diploma in Information Technology Full Mark:60
/Computer Engineering

Year/Part: I/I(New Course) Pass Mark:24

Subject: Logic Circuits Time: 3 hrs.

Candidates are required to give their answers in a practicable. The figures in the margin

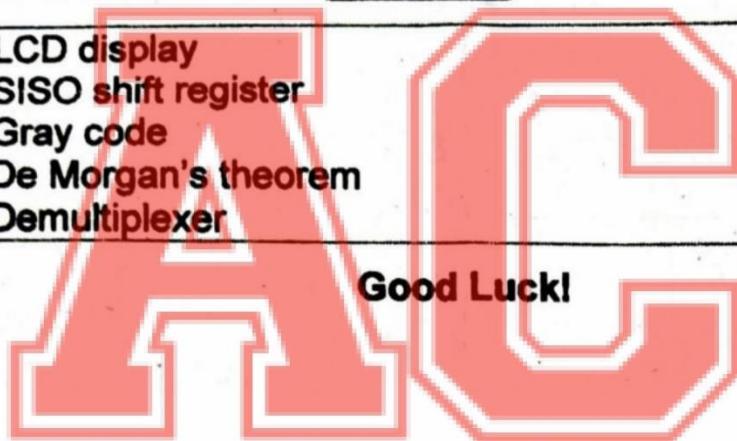


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Attempt Any Five (5) Questions.

1	a) Define Signal. Differentiate between analog and digital signal with suitable example. b) Convert the following number system. i. $(2564.87D)_{16} = (?)_2$ ii. $(4432.123)_8 = (?)_{16}$ iii. $(111101010 * 11010)_2$ iv. $(1101001.110)_2 / (110)_2$ c) Subtract the following $(11101010)_2$ from $(111110000)_2$ using 2's Compliment.	[2+4=6]
2.	a) Explain about AND and OR gate with necessary truth table , symbol and logical expression. b) Define Universal gate. Explain how NOR gate operate as Basic gate with necessary realization technique.	[3+3]
3.	a) Simplify the following expression using K- map. $\Sigma F(A,B,C,D) = \Sigma m(0,1,3,4,7,8,12,15)$ $\Sigma d(2,5,6,14)$ b) Define Adder. Explain the operation of Full adder with clear diagram and truth table.	[6]
4.	a) Define Encoder. Design BCD to decimal decoder with clear circuit diagram and truth table. b) Design 8:1 Multiplexer with clear circuit diagram and truth table.	[1+5]
5.	a) Define Flip-flop. Explain the operation of JK flip flop with necessary diagram and truth table. b) Define counter. Explain the operation of ripple counter with clear diagram	[1+5]

6.	Write short notes on : (Any Four)	[4x3=12]
	a) LCD display b) SISO shift register c) Gray code d) De Morgan's theorem e) Demultiplexer	



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Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2074, Shrawan/Bhadra

Program: Diploma in Computer Engineering

Full Mark: 80

Year/Part: I/II

Pass Mark: 32

Subject: Logic Circuits

Time: 3 hrs.

Candidates are required to give their answers in the answer book as practicable. The figures in the margin are for guidance only.



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Attempt any ten Questions.

1. Differentiate between analog and digital signal. [4+4]
Explain the applications of digital signal.
2. Explain Octal and Hexadecimal number system. [4+4]
Convert following numbers into specified number system.
a) $(101)_{10} = (?)_2$ b) $(564)_8 = (?)_{16}$
3. Divide $(1011010)_2$ by $(111)_2$. Subtract $(1101)_2$ to $(111)_2$ using 2's complement method. [4+4]
4. Explain AND, OR and NOT gates with its truth table and gate diagrams. What are universal gates? Explain. [6+2]
5. Define Boolean Algebra and write down its properties. Explain DeMorgan's Theorems. [3+5]
6. Explain K-Map simplification for two input variable and three input variable with example. [8]
7. Explain Half adder and full adder logic circuits with its combinational circuit diagram. [8]
8. What are decoders? Explain 4-to-1 multiplexer and 1-to-4 demultiplexer. [2+6]
9. Explain RS Flip-Flop and JK Flip-Flop with their truth table. [8]
10. Define shift registers. Explain SISO and SIPO shift registers. [2+6]
11. What are counters? Explain Ripple counters. Write down the applications of counters. [2+3+3]
12. Write short notes on: (Any two) [4*2=8]
 - a. LCD display
 - b. Applications of Flip-Flop
 - c. Encoders
 - d. Alphanumeric display

Good Luck!

**Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur**

Regular/ Back 2075 Shrawan / Bhadra

**Program: Diploma in Computer Engineering / Full Marks: 80
Information Technology**

Year/ Part: I/II(DIT old Course) Pass Marks: 32

Subject: Logic Circuit Time: 3 hrs.

Candidates are required to give the answers in the space provided as far as practicable. The figures in the questions indicate the marks allocated to them.



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Attempt (All) Questions.

1. (a) Differentiate between analog and digital signal with [2+2] example.
(b) Convert the following. [2x2]
 - i. $(1234)_{10}$ into binary
 - ii. $(10110101.01011)_2$ in to decimal

2. (a) Convert the following number system as indicated: [10]
 $(11011.101)_2 = (?)_{10}$
(b) Subtract 11011 from 11001010 using first [3] complement method.

3. (a) What is NAND gate? Draw it's symbol, Write the true [6] table and logic equation for it.
(b) State and prove the De-Morgan's theorem with necessary [6] table and diagram.

4. (a) Simplify using k-map in sum product (SOP) and product [3+3] of sum (POS) from. $F(A,B,C,D) = \sum(1,5,12,14,15)$ and don't care condition. $D(A,B,C,D) = \sum(0,3,4,6,10)$.
(b) Differentiate between combinational logic circuit and [6] sequential logic circuit

5. (a) Explain about Half adder and half adder SOL - [6] stractors' with examples.

Contd.....

- (b) Prove the following equation by using Boolean algebra. [2x3]
i) $X \times X = X$ ii) $X + XY = X$

OR

Design a 3 bits combination of circuit whose output $Y = 1$ when the input binary is greater than or equal to 6.

6. (a) Simplify the following expression and realize it using different gates. [8]

$$AB'C + AB + AD' + ABCD + AC'$$

OR

What is a Decoder? Explain BCD to seven segment decoder with truth table.

- (b) Explain the T Flip-Flop with logic diagram and necessary tables. [6]

7. (a) Define multiplexer. Explain about the serial in serial out shift register. [4+2]

OR

Define counter. Explain about Ripple counter with diagram.

- (b) Write short notes (any three) [3x3=9]

- i. Gray Code
- ii. Universal Gate
- iii. 1-4 De-multiplexer
- iv. LCD display



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Office of the Controller of Examinations
Sanothimi, Bhaktapur

Program: Diploma in Computer Engineering **Full Marks:** 80
Year/Part: I/ II (2018) **Pass Marks:** 32
Subject: Digital Logic **Time:** 3 hrs

Candidates are required to give their answers
practicable. The figures in the margin indicate



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Attempt Any Five questions.

1. a) What do you mean by Propagation delay and Noise Margin? [4]
b) Convert the following: [2x4=8]
 - (i) $(625.256)_{10} = (?)_2$ (iii) $(101101.110)_2 = (?)_{10}$
 - (ii) $(101110.101)_2 = (?)_8$ (iv) $(256.625)_{10} = (?)_{16}$
c) Subtract 10111 from 10011 using 2's complement. [4]
2. a) Why we use NOR gate as AND, OR and NOT gate. [6]
b) State and prove De-Morgan's theorem with suitable diagram and truth table. [6]
c) Prove using Boolean Expression. $(A+B)(A+C) = A+BC$ [4]
3. a) Simplify Boolean expression by using logic diagram: [6]
$$Y = ABCD + AB\bar{C}D + A\bar{B}\bar{C} + A\bar{C}D$$
b) Simplify using K-map in SOP & POS form: $F(A, B, C, D) = \sum m(0, 2, 3, 4, 5, 10, 11, 15) + \sum d(1, 6, 9, 13)$. [6]
c) Compare between combinational logic and sequential logic circuit. [4]
4. a) Define Adder. Explain the full subtractor with truth table and logic diagram. [8]
b) Design a 8:1 MUX with its symbol, truth table and logic diagram. [8]
5. a) Describe the operation of R-S flop-flip with diagram and necessary table. [4]
b) Explain about PIPO shift register. [4]
c) Define Flip-flop. Describe about ripple counter. [2+6]
6. Write short notes on: (Any Four) [4x4=16]
 - a) BCD code d) Encoder
 - b) Master -slow Flip-flop e) Ring counter
 - c) Seven segment display

Good Luck!

Website:- <https://www.arjun00.com.np>

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2077, Chaitra

Program: Diploma in Computer Engineering

Full Marks: 80

Year/Part: I/II (2018 New Course)

Pass Marks: 32

Subject: Digital Logic

Time: 3 hrs

Candidates are required to give their answers in

The figures in the margin indicate full marks.



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Attempt Any Eight questions.

1. Differentiate between Analog and digital signal with example. Give brief description about types of number system. [5+5]
2. Perform the following :
i) $(625.25)_{10} = (?)_2$ ii) $(12AB5)_{16} = (?)_2$
iii) $(1001101)_2 = (?)_8$ iv) $(111000)_2 = (?)_{10}$
v) $(101000110)_2 = (?)_{16}$ [5x2=10]
3. Define complement. Describe about 9's and 10's complement with suitable example. [2+4+4]
4. Explain briefly about basic gates. Prove that NOR gate as universal gate. Website:- <https://www.arjun00.com.np> [5+5]
5. State and prove De-Morgan's theorem. Differentiate between sum of product (SOP) and product of sum (POS). [5+5]
6. Define algebra with its laws. Simplify the following using K-map:
 $F(A,B,C,D) = \Sigma (1,2,4,7,10,12,14) + \Sigma d (6,8,11,13)$ [4+6]
7. What do you mean by Decoder? Design a Decimal to BCD encoder with necessary logic diagram. [3+7]
8. Elaborate about JK and masters-lave flip-flop with its symbol and truth table. [5+5]
9. Compare between synchronous and Asynchronous counter. Explain about SIPO shift register in brief. [5+5]
10. **Write short notes on : (Any Two)** [2x5=10]
a) Gray Code b) 4-to-1 multiplexer
c) Ring Counter d) 7-segment display e) Half Adder

Good Luck !

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Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2078, Magh/Falgun

Program: Diploma in Computer Engineering

Full Marks:80

Year/ Part: I/II (2018)

Pass Marks: 32

Subject: Digital Logic

Time: 3 hrs.

Candidates are required to give their answers in the margin. Figures in the margin indicate full marks.



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Attempt Any Five Questions.

1. a) Differentiate analog and digital signals. What do you mean by positive and negative logic. [6+2]
- b) Perform following task :
 - i Convert $(41.6875)_{10}$ into binary
 - ii Convert $(1001)_2$ into BCD
 - iii Convert $(1011)_2$ into decimal
 - iv Convert $(12AB)_{16}$ into decimal
2. a) Explain about basic gates with necessary truth table and logical expression. [8]
- b) Explain universal gates and why are they called so? Reduce the following expression using k-map.
 $F(A,B,C,D) = \sum(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$ [2+6]
3. a) State and prove De-Morgan theorem using troth table and logic diagram. Subtract $(11101010)_2$ from $(11111000)_2$ using 2's complement. [5+3]
- b) Explain the working of 8 to 1 multiplexer with necessary diagram and truth table. What do you mean by combinational logic circuit? Website:- <https://www.arjun00.com.np> [6+2]
4. a) Define Boolean Algebra. State and explain basic properties of Boolean Algebra. [2+6]
- b) Design BCD to Decimal decoder with necessary diagram and truth table and mention different types of decoder IC package. [6+2]
5. a) Define latch and flip-flop. Explain JK flip-flop with all necessary diagram ; symbol, truth table. [2+6]
- b) Explain Ripple up counter with timing diagram. [8]
6. Write short notes on : (Any Four) [4x4=16]
 - i) SISO shift register
 - ii) LCD display
 - iii) 7- Segment Display
 - iv) Half adder
 - v) Alphanumeric code

Good Luck!

Website:- <https://www.arjun00.com.np>

Regular/Back Exam-2079, Phagun/Chaitra**Program:** Diploma in IT Engineering**Full Marks:** 80**Year/Part:** I/II (2016)**Pass Marks:** 32**Subject:** Digital Logic © Arjun**Time:** 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any FIVE questions.www.arjun00.com.np

1. a) Define signal. Differentiate between analog and digital signal [1+3] with suitable example.
- b) Convert the following number system: [4×2]
 - i. $(2567.350)_{10} = (?)_2$
 - ii. $(BCDE.4A)_{16} = (?)_8$
 - iii. $(1100110011)_2 = (?)_{16}$
 - iv. $(376.351)_8 = (?)_{10}$
- c) Perform the following operation: [2×2]
 - i. Divide: $(1100110011)_2 / (1011)_2$
 - ii. Multiply: $(1011001101)_2 \times (101101)_2$
2. a) State and prove De-Morgan's Theorem with necessary diagram and truth table. [8]
- b) Simplify the following expression using Boolean Algebra. [2×4]
 - i. $Z(Y + Z)(X + Y + Z) = Z$
 - ii. $A'BC + AB'C + ABC + BC'$
3. a) Simplify the following expression using k-map. [2×4]
 - i. $\sum F(A, B, C, D) = \pi m(2, 3, 4, 5, 7, 10, 11, 14) + \sum d(0, 1, 6, 15)$
 - ii. $\sum F(A, B, C, D) = \sum M(0, 1, 4, 8, 11, 12, 15) + \sum d(2, 3, 5, 7)$
- b) Realize basic gate using universal NAND gate only with truth table and logic circuit. [8]
4. a) Define multiplexer. Explain the operation of full subtractor [2+6] with clear logic diagram, truth table and expression.

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- b) Define encoder. Design and explain seven segment Display [2+6] decoder with necessary diagram and truth table.
5. a) Define counter. Explain the operation of 'T' flip flop with [2+6] necessary diagram and truth table.
- b) Define adder. Explain about ripple counter with necessary [2+6] diagram.
6. Write short notes on: (Any Four) [4×4]
- a) ASCII Code
 - b) DTL Logic Family
 - c) AND & OR Gates
 - d) 1:4 De-multiplexer
 - e) SISO Shift Register

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Good Luck!



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Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Scholarship Exam-2080 Bhadra

Program:

**Diploma in Information Technology/
Computer Engineering**

Full Marks: 80

Year/Part: II/I (2022)

Pass Marks: 32

Subject: Digital Logic

Time: 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full mark.

Attempt any FIVE questions.  **www.arjun00.com.np**

1. a. Define signal. Differentiate between analog and digital signal [1+3] with suitable example.
b. Convert the following number system: [4×2]
i. $(10111.01)_2 = (?)_{10}$ ii. $(3471)_8 = (?)_{16}$
iii. $(BCDE.4A)_{16} = (?)_8$ iv. $(3567.350)_{10} = (?)_2$
c. Perform the following operation: [2×2]
i. Multiply: $(11101.11 * 101)_2$
ii. Divide: $(110100.110 / 110)_2$
2. a. Subtract the following $(11001100)_2$ from $(11110000)_2$ using 2's complement. [4]
b. Realize basic gate using NAND gate only with clear diagram [4+4] and truth table. Also, state and prove De-Morgan's Theorem in brief.
c. Explain XOR and NOR gate with truth table and symbol. [4]
3. a. Simplify the following expression using Boolean algebra: [4×2]
i. $A'B'C' + A'BC' + AB'C' + ABC' = C'$
ii. $A(A' + C)(A'B + C)(A'BC + C') = 0$
b. Simplify the following expression using k-map. [4×2]
i. $\Sigma f(A, B, C, D) = \pi M(2, 3, 4, 5, 7, 10, 11, 14) + \Sigma d(0, 1, 6, 15)$
Draw logic diagram.
ii. $\Sigma f(A, B, C, D) = \Sigma m(0, 1, 4, 8, 11, 12, 15) + \Sigma d(2, 3, 5, 6, 7)$
Draw logic diagram. www.arjun00.com.np
4. a. Define encoder. Explain the decimal to binary encoder with [2+6] suitable diagram and truth table.

Cont. ...

- b. Differentiate between combinational and sequential circuit [4] with example.
- c. Design 1:4 De-multiplexer with clear circuit diagram and [4] truth table in brief.
5. a. Design RS flip-flop with necessary diagram. Write the [6+2] advantages of JK flip-flop.
- b. Define shift register. Explain the operation of ripple counter [2+6] with clear diagram.
6. Write short notes on: (any **FOUR**) [4×4]
- a. 7 segments display
 - b. SIPO shift register
 - c. D flip-flop
 - d. Half adder
 - e. ASCII code
 - f. BCD code

Good Luck !



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