



GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

KOMMADI, MADHURAWADA, VISAKHAPATNAM - 530 048

(APPROVED BY AICTE, NEW DELHI, AFFILIATED TO ANDHRA UNIVERSITY, VISAKHAPATNAM)

(ACCREDITED BY NATIONAL BOARD OF ACCREDITATION [NBA] FOR B.TECH CSE, ECE AND IT - VALID FROM 2019-22 AND 2022-25)

(ACCREDITED BY NATIONAL BOARD OF ACCREDITATION [NBA] FOR B.TECH EEE VALID FROM 2023-24 TO 2025-2026)

(ACCREDITED BY NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL [NAAC] WITH A GRADE- VALID FROM 2022-27)

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Name of the faculty: DIVYA SATHI BALAGA

Subject: DIITAL LOGIC DESIGN

Regulation: R20

Topic: 5 IMPORTANT QUESTIONS FROM EACH UNIT

UNIT- I: Digital Systems and Binary Numbers:

1. a) The binary numbers listed have a sign bit in the leftmost position and if negative numbers are in 2's complement form. Perform the arithmetic operations indicated and verify the answers.

(i) $101011 + 111000$ (ii) $001110 + 110010$ (iii) $111001 - 001010$ (iv) $101011 - 100110$

b) Convert the following to Decimal and then to octal.

(i) $(125F)_{16}$ (ii) $(10111111)_2$ (iii) $(4234)_{10}$

2. Convert the following to required form i) $(163.789)_{10} = ()_8$

ii) $(101101110001.00101)_2 = ()_{10}$ iii) $(292)_{16} = ()_2$.

3. Perform the given subtraction using 1's and 2's complement methods:

$(10110)_2 - (1101101)_2$.

4. Convert the following i) $AB_{16} = ()_{10}$ ii) $12348 = ()_{10}$ iii) $77210 = ()_{16}$.

5. Perform the following subtraction in binary using 1's and 2's complement methods: $(199)_{10} - (254)_{10}$.

UNIT -II: Concept of Boolean algebra & Gate level Minimization:

1. Reduce the following Boolean expressions.

i) $AB + A(B+C) + B(B+C)$

ii) $ABEF + AB(EF)' + (AB)'EF$.

iii) $A'B' + A'BC' + A'BCD + A'BC'D'E$.

2. Write the Postulates and theorems of Boolean algebra.

3. Simplify the following using K-map method in SOP and POS forms.

$F(A,B,C,D,E) = \sum(0,2,4,6,9,11,13,15,17,21,25,27,29,31)$.

4. Find the complement of the following and show that $F \cdot F' = 0$ and $F + F' = 1$.

i) $F = (x+y+z)(x+z')(x+y)$

5. Express the following function in sum of Minterms and product of Maxterms.

i) $F(x,y,z) = (xy+z)(y+xz)$

ii) $F(x,y,z) = 1$



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UNIT- III: Combinational Logic:

1. Design a full adder by using two half adders.
2. Explain about decoder circuit and implement the 4×16 decoder by using two 3×8 decoders.
3. Design a 4-bit carry look ahead adder circuit.
4. Design a combinational circuit for a 2-bit magnitude comparator.
5. Obtain the simplified expression in sum of products and product of sums form using K-map method. $F(A,B,C,D,E) = \sum (0,1,4,5,9,16,17,21,25,29)$

UNIT- IV: Synchronous Sequential Logic:

1. What is a flip-flop? Design the basic flip-flop using NOR gates and explain.
2. What is an excitation table? Write the excitation tables for JK and T flip-flops.
3. Draw a neat circuit diagram of positive edge triggered D flip-flop and explain its operation.
4. Distinguish between combinational logic and sequential logic.
5. Draw a neat circuit diagram of a negative edge triggered JK flip-flop and explain its operation.

UNIT -V: Registers and Counters:

1. Write the differences between synchronous and Asynchronous Counters.
2. Explain the operation of the 4-bit asynchronous counter.
3. Explain the working of a 4-bit register which uses parallel load with a logic diagram;
4. Design a 4-bit ripple counter using T-flip-flop. Explain using wave forms
5. Draw and explain 4-bit universal shift register.