Total number of printed pages-02

2(Sem-8/FYUGP)BNC(A)/DSCI

2025

Computer Science

(Discipline Specific Core)

Paper Name: Digital Logic Fundamentals

Paper Code: **BCA-DSC-145**

Full Marks: 60

Time: Two and Half Hours

(*The figures in the margin indicate full marks for the questions)*

Answer in English

1. Answer the following questions as directed: 1x7=7

a) Write the full form of ASCII.
b) What is a Flip Flop?
c) What is an inverter?
d) Which logic gate is known as Universal Gate and why?
e) Write the De-Morgan theorem.
f) What is combinational circuit
g) What do you mean by binary numbers.

2. Answer any four of the following questions: 2x4=8

a) What is ROM?
b) What do you mean by minterm and maxterm?
c) Convert $(100101)_2$ to decimal number.
d) What is shift register?
e) What is binary number system?

3. Answer the following questions (any three): 5x3=15

a) Explain multiplexer with logic diagram.

b) Explain Full Adder with truth table and circuit diagram.

c) Briefly explain the J-K flip-flop with circuit diagram.

d) Simplify the Boolean function using K-Map,
$F(W,X,Y,Z) = \sum(1,3,7,11,15)$ with Don't care
$d(w,x,y,z) = \sum(0,2,5)$

e) Find the complement of Boolean functions.
(i) F1 = x' yz' + x' y'z (ii) F2=x(y'z'+yz)

4. Answer any three of the following questions: 10x3=30

a) What is counter? Design a 3-bit binary counter and give logic diagram.

b) What is digital system? Write characteristics of digital system.

c) What is an Encoder? Explain Octal to Binary Encoder with proper diagram and function table.

d) Explain different postulates and basic theorems of Boolean algebra with example.

e) For a 3-bit shift register explain the operation for serial in serial out shift.

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