

Roll No.

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Paper ID [A0210]

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BCA (205) (S05) (O) (Sem. - 2nd)**DIGITAL CIRCUITS AND LOGIC DESIGN****Time : 03 Hours****Maximum Marks : 75****Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Nine** questions from Section - B.

Section - A**Q1)****(15 × 2 = 30)**

- a) Convert (i) 11011.11(binary number)to decimal number.
(ii) 7825.6875 decimal number to octal.
- b) Convert (i) 125.89 binary number to BCD number.
(ii) A4F to Octal number.
- c) Simplify
$$\overline{(a+b)} + \overline{(a+b)}$$
- d) Prove using truth table
$$A + \overline{A}B = A + B$$
- e) Draw the logic diagram & truth table of Full adder.
- f) Define the term propagation Delay.
- g) Simply the following logic function using k-map and find the minterms & maxterms.

$$F(X,Y,Z) = \overline{X}Z + X\overline{Y}Z + YZ$$

- h) Write the truth table of 3:8 Decoder.
- i) State & prove the De-Morgan theorems.
- j) What do you mean by race around condition?
- k) Explain the term LOCKOUT with the help of a suitable example?
- l) What is the difference between Latch and a Flip-Flop?
- m) What is a shift register? What are the various configurations of shift register?
- n) Differentiate between synchronous & asynchronous logical circuits.
- o) Explain the operation of master-Slave Flip-flop?

Section - B

(9 × 5 = 45)

Q2) What do you mean by error detecting and correcting codes? Explain both with the help of suitable examples.

Q3) Obtain the truth table of the following & implement it by using NAND Gates?

$$F(A,B,C) = (A\bar{B} + BC)(AC + B\bar{C})$$

Q4) Minimize the following Using K-Map and Realize it with NAND Gates?

$$F(A,B,C,D) = \sum m(2,3,4,5,13,15) + \sum d(8,9,10,11)$$

Q5) Implement BCD to Excess-3 Code converter?

Q6) Explain the following terms with help of suitable examples:

- (a) HAZARDS.
- (b) RACES.

Q7) Implement following using 4X16 Decoder.

$$F = X Y + \bar{Z}$$

Q8) What do you mean by Multiplexer. Draw the block diagram and logical diagram of 4:1 Multiplexer.

Q9) Design a synchronous counter using JK flip-flop for the following sequence?

000,101,110,111,011,010,000

Q10) Explain the term universal shift register.

Q11) Classify the counters and Discuss the BCD Counters. Also explain Ring counters.

Q12) Explain the various rules of k-map reduction technique.

Q13) Give any five differences between combinational & sequential logical circuits.

