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BCA (Sem. - 2nd)

DIGITAL CIRCUITS AND LOGIC DESIGN

SUBJECT CODE : BC-205

Paper ID : [B0209]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

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

Section - A

Q1) *(10 × 2 = 20)*

a) Differentiate between sequential and combinational logic circuits.

b) Give the truth table for J-K flip flop. How is it better than S-R flip flop?

c) Define minterm and maxterm.

d) Using 8-bits, represent the integers -48in

(i) One's complement form.

(ii) Two's complement form.

e) Convert 532.372_{10} into its binary equivalent.

f) Explain the difference between the terms characteristic table and excitation table.

g) What is encoder?

h) How T-flip flop can be implemented using NAND gate?

i) What is multiplexer?

j) Express the Boolean function $F=xy+x'y$ as a product of max terms.

Section - B

(4 × 10 = 40)

Q2) (a) Simplify the following Boolean function using a K-map.

$f(A, B, C, D) = \Sigma m(0, 1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15)$

(b) Minimize the following function F using K-map.

$F(A, B, C) = \overline{B}\,\overline{C} + ABC + AB\overline{C}$

Q3) (a) Write the truth table of an OR gate and explain its behavior. Realize an OR gate using NAND gates only.

(b) Draw the circuit of a radix-8 synchronous up counter and using timing diagrams explain its working.

Q4) Describe in detail error detecting and error correcting codes. Bring out their advantages and disadvantages as error detectors.

Q5) Design a counter to count the sequence 000, 001, 011, 111, 110, 100, 000 ...

Q6) Design a sequential circuit with 4 JK Flip-Flops ABCD, the next states of B, C, D are equal to the present states of A, B, C. The next state of A is equal to the EX-OR of the present states of C and D.

Q7) What is a shift register? What are its various types? What are its applications?