

Roll No.

Total No. of Questions : 09]

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Paper ID [CS205]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Semester - 3rd)

DIGITAL CIRCUITS & LOGIC DESIGN (CS - 205)

Time : 03 Hours

Maximum Marks : 60

Instruction to candidates :

- 1) Section - A is **compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

(10 × 2 = 20)

Q1)

- a) Find the value of x in the following.
 $(1100.1011)_2 = (x)_{10}$
- b) Realize AND gate using NOR gates only.
- c) Differentiate between synchronous and asynchronous counters.
- d) Define the term resolution of a D/A converter.
- e) What is the minimum voltage value that is considered as high stage input in case of TTL logic family.
- f) A presetable counter has eight flipflops. If the preset number is 125, what is the modulus?
- g) What are the advantages of CMOS memory chips over bipolar memory chips?
- h) Define 1's and 2's complements.
- i) Define the term resolution of an A/D converter.
- j) Using boolean algebraic theorems, prove that

$$A + \bar{A}B + A\bar{B} = A + B$$

Section - B

(4 × 5 = 20)

Q2) Find the value of x in the following:

- | | |
|-------------------------------|-----------------------------|
| (a) $(835)_{10} = (x)_{BCD}$ | (b) $(ETC.B)_{16} = (x)_8$ |
| (c) $(1101.101)_2 = (x)_{10}$ | (d) $(12.354)_{10} = (x)_2$ |
| (e) $(BEE)_x = (2699)_{10}$ | |

Q3) Simplify the following boolean functions using K-maps.

(a) $F(A, B, C) = \sum (0, 2, 3, 4, 6,)$

(b) $F(A, B, C, D) = \sum(1, 3, 5, 7, 9, 15), d(A, B, C, D)=\sum(4, 6, 12, 13)$

Q4) Draw and explain the operation of TTL inverter.

Q5) Implement the following Boolean function with a multiplexer.

$F(A, B, C, D) = (0, 1, 3, 4, 8, 9, 15)$

Q6) Draw the circuit diagram of a mod-5 counter and convert it into decade counter.

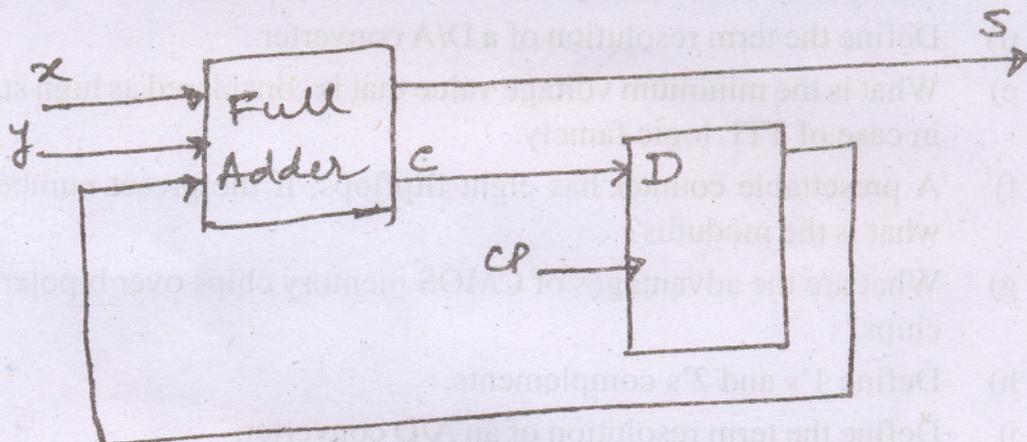
Section - C

(2 × 10 = 20)

Q7) Name and discuss the various types of semiconductor memories.

Q8) (a) Write a short note of Bus structures.

(b) Derive the state table and state diagram of the following sequential circuit.



Q9) (a) Find the output voltage from a 5-bit ladder that has a digital input of 11010. Assume that 0 = 0v and 1 = +10v.

(b) Write a short note on VLSI design.