16/12/16

No. of Printed Pages: 2

Roll No._____

DOON UNIVERSITY, DEHRADUN

End Semester Examination, December-2016

SEMESTER-I

MCA(Integrated): TMC-103[Digital Circuits & Systems]

MSc CS(Integrated): CSC-102[Digital Electronics & System Design]

Time Allowed: 3Hours *Maximum Marks: 50*

Note: Question paper is divided into three sections A, B & C. Marks distribution is given alongside. Follow the instruction as given in each section.

SECTION: A

Que-1 **[Marks: 4*1=04]**

a) Draw the excitation table of J-K Flip-flop.

b) Represent $(25)_{10}$ in Excess-3 Code.

c) Represent the following signed number in 2's complement method:

i) +25 **ii)** -25

d) There are 15 address lines in a RAM. How many addressable locations are to load data into it. If this memory can accommodate 4 byte Word in any addressable location, calculate the storage capacity of this RAM.

Que-2 **[Marks: 3*2=06]**

a) Write Verilog and VHL Code for Full Adder.

b) Convert $(650.17)_8$ into decimal, binary, base 4 and hexadecimal.

c) What do you understand by Combinational Circuits and Sequential Circuits? Discuss in detail.

SECTION: B

[Marks: 5*4=20]

Que-3 Design 16:1 MUX using 4:1 MUX.

Que-4 Explain the operation of a 4 bit shift register.

Que-5 Convert the following :-

a) JK to D **b)** JK to T

Que-6

a) Simplify the Boolean expression using Boolean algebra rules.

$$Y=A'BC+AB'C+ABC'+ABC$$

b) Express it is standard POS Form

$$Y=(A+B)(A+C)(B+C')$$

Que-7

a) Design a full Adder using a decoder and additional gates.

b) Discuss some Applications of flip flops and registers.

SECTION: C

Que-8 **[Marks :2*5=10]**

a) What do you understand by Counters. Design the circuit diagram of 4-bit Ring-Counter

b) Design a 4-bit binary comparator that accept inputs A and B and gives three outputs. G,E and L.

(i) Output G, when A<B

(ii) Output E, when A=B

(iii) Output L, when A>B

Que-9 **[Marks :1*10=10]**

Simplify using K-map, obtain minimal SOP equation and realize only by using NAND gates.

$$f(A, B, C, D) = \sum (1,2,3,8,9,10,11,14) + d(7,15)$$