B. Tech. Sem -III (E & TC Engg.) (2014 COURSE) (CBCS) : WINTER - 2018

SUBJECT: DIGITAL CIRCUITS & APPLICATIONS

Day: Friday
Date: 30/11/2018

Time: 10.00 AM TO 01.00 PM
Max Marks. 60

W-2018-2324

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks
3) Draw the labeled diagrams **WHEREVER** necessary

Q.1 **a)** What is BCD code? Explain the rules for BCD addition with one example **(04)**

b) Minimize the logic function using K map and draw logic diagram **(06)**
$f(A,B,C,D)=\sum m(0,1,2,3,5,7,8,9,11,14)$

OR

a) Convert following decimal numbers into it's equivalent binary numbers **(05)**
I.$(25.75)_{10}$ II.$(115)_{10}$

b) What are Demorgan's theorems? Write them in equation form, prepare their truth tables to prove their correctness **(05)**

Q.2 **a)** Draw 4-bit parallel adder diagram using full adder. **(05)**

b) What is Priority encoder? **(05)**

OR

a) What is comparator? Explain 2 bit magnitude comparator **(05)**

b) What is code converter? Explain any type of code converter **(05)**

Q.3 **a)** What are the characteristics of digital ICs and families? Explain **(05)**

b) Draw And explain the operation of CMOS NOR gate **(05)**

OR

a) Design and explain standard TTL with open collector output configuration **(05)**

b) Draw And explain the operation of CMOS NAND gate **(05)**

Q.4 **a)** What is the difference between latch and flip flop **(03)**

b) Reduce the number of states in the following state tables and draw state diagram for it **(07)**

Present state	Next state		Output	
	X=0	X=1	X=0	X=1
a	f	b	0	0
b	d	c	0	0
c	f	e	0	0
d	g	a	1	0
e	d	c	0	0
f	f	b	1	1
g	g	h	0	1
h	g	a	1	0

P.T.O.

OR

a) Design T flip flop using J-K flip flop **(05)**

b) What is state machine? Explain Mealy and Moore state machines with examples **(05)**

Q.5 **a)** What are types of shift registers? Explain anyone in detail **(05)**

b) Design 4 bit Asynchronous up counter **(05)**

OR

a) What is the difference between Synchronous and Asynchronous counter? **(05)**

b) Design 4 bit Ring counter. **(05)**

Q.6 **a)** A combinational circuit is defined by function **(05)**
$F_1 = \sum m (1,5,7, 9,11,12)$
$F_2 = \sum m (5,6,7,10,11,13,15)$
Implement the circuit with PLA

b) Draw and explain structure of SRAM **(05)**

OR

a) Implement full adder using PROM **(05)**

b) Draw and explain structure of DRAM **(05)**

* * * *