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B.E. / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

BIO - MEDICAL ENGINEERING - BRANCH

Fourth Semester

EC8351 - DIGITAL ELECTRONICS AND SYSTEM DESIGN

(Regulations :2012)

Duration: 3 Hrs.

Maximum Marks 100

Answer All Questions

Part A

10 X 2 = 20 Marks

- 1 Convert the following decimal number to hexadecimal
 4354.537
- 2 Simplify the following Boolean expression to a minimum number of literals
 $xyz + x'y + xyz'$
- 3 Draw the circuit diagram of full adder using half adder
- 4 Implement the following function using PROM
 $f(a,b,c) = \Sigma(1,3,5,7)$
- 5 Write down the characteristic equation and excitation table of D flip flop
- 6 What is the difference between Moore and Mealy machine?
- 7 Define stable state
- 8 What is critical race? Give example?
- 9 Define fanout
- 10 What is the difference between static and dynamic memories?

Part B

5 X 16 = 80 Marks

- 11
 - i) Reduce the following function using tabulation method (12 marks)
 $f(A,B,C,D,E) = \Sigma(0,1,2,6,7,9,10,15,16,18,20,21,27,30)$
 - ii) Convert the following to the other canonical form (4 marks)
 $f(A,B,C,D) = \Sigma(0,2,6,11,13,14)$
- 12
 - a)
 - i) Draw the circuit diagram of 2 bit Magnitude comparator and explain its operation (8 marks)
 - ii) Draw the circuit diagram and explain 2 to 1 mux, built 4 to 1 mux using 2 to 1 mux (8 marks)

(or)

 - b)
 - i) Implement the following function using PAL (10 marks)
 $f_1(x,y,z) = \Sigma(1,2,4,6)$
 $f_2(x,y,z) = \Sigma(0,1,6,7)$

- ii) Implement the following function using decoder (6 marks)

$$f(w,x,y) = \Sigma(0,2,4,5,6)$$

- 13 a) i) Draw the circuit diagram and explain the operation of Johnson counter and how do you overcome the disadvantage of Johnson counter (8 marks)

- ii) Draw the circuit diagram of BCD ripple counter and explain its operation (8 marks)

(or)

- b) Reduce the following state table to minimum number of state

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

- 14 a) i) What is cycle? What is the disadvantage of cycles in the asynchronous circuits? (4 marks)

- ii) Briefly explain static and dynamic hazards with an example and how do you overcome this problem (12 marks)

(or)

- b) An unclocked, edge sensitive J-K flip flop works as follows:
 When J changes from 0 to 1, Q becomes (or remains) 1. When K changes from 0 to 1, Q becomes (or remains) 0. When J and K simultaneously changes from 00 to 11, Q changes state. The flip flop output does not change when J changes from 1 to 0 or K changes from 1 to 0, or JK changes from 11 to 00. Changes of JK from 01 to 10 or 10 to 01 are not permitted. Find a primitive flow table with a minimum number of rows

- 15 a) i) Explain with circuit diagram the CMOS inverter (4 marks)

- ii) Draw the circuit diagram of 3 input NAND and NOR gate using CMOS gate (12 marks)

(or)

- b) i) Draw 1 bit basic memory cell and explain its operation. From this built 3x3 memory cell and explain how read and write operation can be done (10 marks)

- ii) Draw 2 input Open collector TTL gate and explain its operation (6 marks)