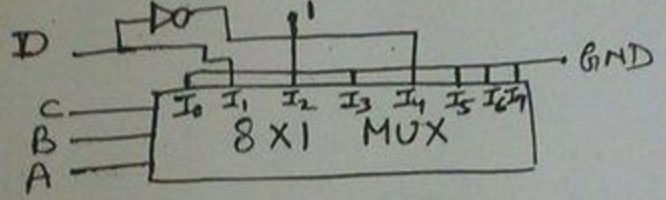
PEC UNIVERSITY OF TECHNOLOGY
End-Term Examination, May 2016

Programme: B.E (ECE)
Course Name: Digital Design
Maximum Marks: 80

Year/Semester: 1st / 2nd
Course Code: ECN 103
Time allowed: 3 Hours

Notes:

- All questions are compulsory.
- The candidates, before starting to write the solutions, should please check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right course code.

Q. No.		Marks
1. a)	Apply suitable Boolean laws and theorems to modify the expression for a two input XOR gate in such a way so as to implement a two input XOR gate by using minimum number of NAND gates..	5
b)	$\bar{A}B + CD$ is a simplified Boolean expression of the expression $ABCD+\bar{A}\bar{B}CD+\bar{A}B$. Determine if there are any don't care enteries.	5
2. a)	Design a BCD adder circuit capable of adding BCD equivalents of two digit decimal numbers.	10
b)	Find the Boolean expression implemented by the circuit shown 	5
c)	Convert D FF to T FF. What are synchronous and asynchronous inputs in FFs.	5
d)	Design a three bit magnitude comparator circuit having one output that goes high when the two three bit numbers are equal.Use only NAND gates	5
3. a)	Determine the number of Flip Flops required to construct a (i) MOD 10 Ring Counter b) MOD 10 Johnson counter. Draw the circuits and write the count sequence.	7
b)	Design MOD 5 synchronous counter using JK ffs. Then design MOD 10 counter by cascading MOD 5 and MOD 2 counters. Show the count sequence of MOD 10 counter using waveforms.	7
c)	Draw the input and output waveforms for storing a number 1010 in 4 bit Serial In Serial Out Shift Register(Use D FFs)	6

4. a)	Name the steps involved in Analog to Digital Conversion. Draw the block diagrams of 3 bit parallel comparator type A/D converter and successive approximation type A/D converter	7
b)	Explain the following terms a) Fan Out b) Propagation Delay c) Noise Margin d) Power Dissipation for logic families. Which logic family has least power dissipation?	8
5. a)	Design a two bit Comparator circuit using PLA. The circuit should give four outputs corresponding to equal to, not equal to, less than and greater than conditions.	6
b)	Design 111 sequence detector using Mealy and Moore Machines. Compare the two designs. Use JK flip flops only.	10
c)	Give one application performed by the following circuit. Explain your answer	4