2008-PUNJAB TECHNICAL UNIVERSITY

B.TECH I SEMESTER REGULAR EXAMINATION

SWITCHING THEORY AND LOGIC DESIGN

(ELECTRICAL AND ELECTRONICS ENGINEERING)

TIME-3HOUR
MARKS-80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS

MARKS [16*5=80]

1. (a) Perform the following using BCD arithmetic.

i. 712910 + 771110
ii. 812410 + 812710

(b) Convert the following.

i. AB16 = ( )10
ii. 12348 = ( )10
iii. 101100112 = ( )10
iv. 77210 = ( )16

2. (a) Convert the following expressions in to sum of products and product of sums

i. (AB+C) (B+C'D)
ii. x'+x(x+y')(y+z')

(b) Obtain the Dual of the following Boolean expressions.

i. (AB'+AC')(BC+BC')(ABC)
ii. AB'C+A'BC+ABC
iii. (ABC)'(A+B+C)'
iv. A+B'C (A+B+C')

3. (a) What is meant by a prime implicant, an essential prime implicant, and a secondary essential prime implicant?

(b) Minimize following function using Map method F (A, B, C, D) = QM(2, 3, 8, 12, 13) + d(10, 14)

4. (a) Implement the following multiple output combinational logic using a 4 line to 16 line Decoder.
Y1 = ¯ A¯B ¯ C ¯D + ¯ A¯B CD + ¯ A¯BC ¯D + ¯ ABC ¯D + A¯BC ¯D + A¯BCD
Y2 = ¯ A¯B ¯ CD + ¯ AB ¯ C ¯D + A¯BC¯D + ABC¯D
Y3 = ¯ ABCD + ABC ¯D + ABCD.

(b) Explain the terms Multiplexing and Demultiplexing.

5. (a) Specify the size of a ROM (number of words and numbers bits per word) that will accommodate the truth table of a BCD to seven segment decoder with an enable input.

(b) Write a brief note on programmable logic devices.

6. (a) Find a modulo-6 gray code using k-Map & design the corresponding counter.

(b) Compare synchronous & Asynchronous.

7. A clocked sequential circuit is provided with a single input x and single output Z. Whenever the input produce a string of pulses 1 1 1 or 0 0 0 and at the end of the sequence it produce an output Z = 1 and overlapping is also allowed.

(a) Obtain State - Diagram.
(b) Also obtain state - Table.
(c) Find equivalence classes using partition method & design the circuit using D flip-flops.

8. For the ASM chart

(a) Draw the state diagram.
(b) Design the control unit using D flip-flops and a decoder.