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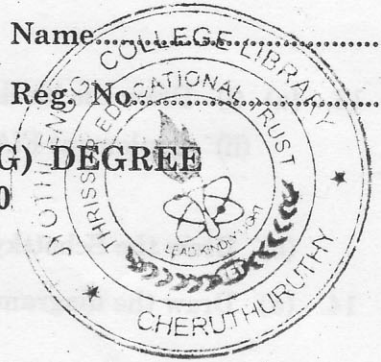
Name .....

Reg. No. ....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, DECEMBER 2010

EC 09 305  
PTEC 09 304 DIGITAL ELECTRONICS

(2009 admissions)



Time : Three Hours

Maximum : 70 Marks

**Part A**

Answer all questions.  
Each question carries 2 marks.

1. Write De Morgan's theorem with three variables.
2. Simplify  $F(x, y, z) = \Sigma(0, 1, 5, 7)$  using three variable map.
3. Write the significance of Gray code.
4. Write the concept of Johnson counter.
5. Write the applications of ASM Chart.

(5 × 2 = 10 marks)

**Part B**

Answer any four questions.  
Each question carries 5 marks.

6. Draw a NAND logic diagram that implements the complement of the function  $F(A, B, C, D) = \Sigma(0, 1, 2, 3, 4, 8, 9, 12)$ .
7. Determine the value of base  $x$  if  $(211)_x = (152)_8$ .
8. Explain the principle of encoder.
9. Give the excitation tables of SR, D JK and T flip-flops.
10. Write short notes on Moore's model.
11. Construct a MOD-12 counter.

(4 × 5 = 20 marks)

**Part C**

Answer section (a) or section (b) of each question.  
Each question carries 10 marks.

12. (a) Simplify the Boolean function by means of the tabulation method :  
 $P(A, B, C, D, E, F, G) = \Sigma(20, 28, 52, 60)$ .

Or

- (b) What are universal gates ? Construct full adder and half adder using only the universal gates.

Turn over

13. (a) (i) Draw the block diagram of a BCD adder and explain. (5 marks)  
(ii) Implement  $F(A, B, C) = \Sigma (1, 3, 5, 6)$  with a multiplexer. (5 marks)

Or

- (b) Draw the Schottky TTL gate and explain.  
14. (a) Draw the diagram of D-type positive edge triggered flip-flop and explain.

Or

- (b) Explain the operation of shift registers and discuss their types.  
15. (a) Design a sequential circuit with two JK flip-flops A and B and two inputs E and x. If  $E = 0$ , the circuit remains in the same state regardless of the value of x. When  $E = 1$  and  $x = 1$ , the circuit goes through the state transitions from 00 to 01 to 10 to 11 back to 00 and repeats. When  $E = 1$  and  $x = 0$ , the circuit goes through the state transitions from 00 to 11 to 10 to 01 back to 00 and repeats.

Or

- (b) Design a counter with the following repeated binary sequence 0, 1, 3, 7, 6, 4 using T flip-flops. [4 × 10 = 40 marks]