D 10045 (Pages : 2) 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) = Σ (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) = Σ (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) = Σ (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]