D 51493 (Pages 2)

Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2008

AI/BM 04 305—DIGITAL SYSTEMS

(2004 admissions)

Time : Three Hours Maximum : 100 Mark

Answer **all** *questions.*

Part A

1. Verify whether $A+BC+\overline{AC}=BC$ and reduce $f=(a+b)(a+c)(b+c+d)$.
2. Determine the single error correcting code for the BCD number 1001 (information bits) using even parity.
3. Develop the circuit of a two bit binary comparator and explain its working.
4. Give the excitation tables and characteristics equations of JK and D flip-flops and explain.
5. Develop a 4-bit SISO shift register using SR flip-flop. Demonstrate the working with waveforms.
6. Draw any *one* open collector discrete gate circuit and explain its theory.
7. What is a state ? Explain the concept of synchronous state machines.
8. Develop the state diagram of a 3-bit UP/DOWN gray code counter with a control input and explain.

(8 × 5 = 40 marks)

Part B

9. (a) Develop a full adder circuit using minimum number of discrete gates. Make use of K-map for design procedure. Implement the sane system using NAND gates alone.

Or

(b) How negative numbers are represented in binary ? Explain and compare any *two* methods with suitable numerical examples of your choice.

10. (a) Draw the basic block diagram of a single digit BCD adder and explain the operation.

Or

(b) Differentiate between decoder and demultiplexer. Implementary = $\Sigma m0,2,3,4,5)$ using a suitable decoder and demultiplexer.

Turn over

11. (a) Design a counter to pass through.....0, 2, 3, 5, 7.....using JK flip-flop. The system should be free from lockout. Give the state table of the system.

Or

(b) Draw the basic gate in ECL. Explain the working. Compare it with CMOS and TTL on power dissipation, speed, fanout, and package density.

12. (a) With block diagrams and suitable examples, differentiate between Moore and Mealy machines.

Or

(b) Design a state machine which recognizes the pattern 1010 and provide its state table.

(4 × 15 = 60 marks)