Reg. No. _____

Karunya University

(Karunya Institute of Technology and Sciences)

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – November/December 2011

Subject Title : DIGITAL ELECTRONICS **Time : 3 hours**

Subject Code: EC209 **Maximum Marks: 100**

Answer ALL questions

PART – A (10 x 1 = 10 MARKS)

1. What is the exact number of bytes in a system that contains 32K byte?
2. Given 8 bit string A=10101101, evaluate the logical operation NOT A.
3. What is a combinational circuit?
4. Draw the half-adder circuit.
5. Define flip-flop.
6. What is a counter?
7. Write the characteristic equation of D flip-flop.
8. What is meant by state reduction problem?
9. How many address lines and input-output data lines are needed in 4K*16 memory units?
10. Name the three major types of programmable logic device.

PART – B (5 x 3 = 15 MARKS)

11. Represent -39 in 8-bit form for sign magnitude, sign 1's and sign 2's complement form.
12. Discuss about code converters.
13. Differentiate synchronous and asynchronous counters.
14. Summarize the procedure for designing synchronous sequential circuits.
15. Explain Integrated Injection Logic.

PART – C (5 x 15 = 75 MARKS)

16. a. Formulate a weighted binary code for the decimal digits using weights 6, 3, 1, 1. (5)
    b. Explain about Alphanumeric codes. (6)
    c. State and prove De Morgan's Law. (4)

(OR)

17. Simplify the Boolean function using Quine Mcclausky Method
    $F=\sum (0, 1, 2, 8, 10, 11, 14, 15)$

18. Explain in detail about carry look ahead adder.

(OR)

19. a. Design a combinational circuit that compares two 4 –bit numbers to check if they are equal. The circuit output is equal to 1 if the 2 numbers are equal and 0 otherwise. (7)
    b. Design a combinational circuit with 3 inputs and one output. The output is 1 when the binary value of the inputs is less than 3. The output is 0 otherwise. (8)

20. An RS flip-flop has 4 operations: clear to 0, no change, complement and set to 1, when inputs R and S are 00, 01, 10 and 11 respectively. (a) Tabulate the characteristic table (b) Derive the characteristic equation (c)Tabulate the excitation table (d) Show how the RS flip-flop can be converted to a D flip-flop.

(OR)

21. Design a counter with the following repeated binary sequence: 0, 1,2,4,6. Use D flip-flops.

[P.T.O]

22. A sequential circuit with 2 D flip –flops ,A and B; 2 inputs, x and y; and one output, z, is specified by the following next state and output equations:

    A (t+1)=x′y+xA

    B (t+1)= x′B+xA

    Z=B

    a. Draw the logic diagram of the circuit
    b. List the state table for the sequential circuit
    c. Draw the corresponding state diagram

(OR)

23. a. Explain the difference between asynchronous and synchronous sequential circuits. (5)
    b. Explain the difference between stable and unstable states with an example. (5)
    c. What is the difference between an internal state and a total state? Give one example to explain them. (5)

24. a. Explain about ROM with an example. (7)
    b. Discuss about Programmable Array Logic. (8)

(OR)

25. Explain in detail about TTL, ECL and CMOS digital logic families. (3x5)