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Paper Code : EC302 Digital System Design

UPID : 003461

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) The excess-3 code of 584 is given by

(II) If the values of R and S are 0, 1 respectively, then the present state and next states are

(III) What is the minimum input voltage corresponding to the logic 1 state?

(IV) In which logic devices both AND-plane and OR-plane are programmable?

(V) A Carry Look Ahead adder is frequently used for the addition because it _____

(VI) The Moore circuit output depends on _____

(VII) A BCD subtractor requires how many parallel adders? —

(VIII) Shifting binary data to right by one-bit position using shift right register, results

(IX) If the fan-out parameter of an IC is indicated as 12, it means that

(X) Which model of VHDL used port mapping?

(XI) Which number system has radix 4?

(XII) Mention one of the major drawbacks of using asynchronous counters.

Group-B (Short Answer Type Question)

Answer any three of the following [5 x 3 = 15]

2. What is a logic gate? Mention its types. [5]
3. What do you mean by signed and unsigned number representation? How many ways a signed integer can be represented? [5]
4. Draw the logic circuit of the S-R flip-flop using the D flip-flop. [5]
5. Classification of Digital IC Logic families [5]
6. Design the circuit of the Universal shift register. Mention the applications of the Shift register. [5]

Group-C (Long Answer Type Question)

Answer any three of the following [15 x 3 = 45]

7. (a) What is meant by K-Map or Karnaugh Map? Define Quad and Octet. [5]
   (b) What are the advantages and disadvantages of the K-Map Method? [5]
   (c) How we can implement a 6-variable K-map using a 5-variable? [5]
8. (a) What is a flip-flop? Mention the applications of Flip-Flops. [5]
   (b) What is a Sequential circuit? Mention the applications of sequential circuits. [5]
   (c) Compare Asynchronous counter and Synchronous counter [5]
9. (a) Give differences between Latches and Flip-flops. [5]
   (b) Explain the operation of the SR latch using NAND gates. [5]
   (c) Explain the operation of the SR latch using NOR gates. [5]
10. (a) Classification of Semiconductor memories [5]
    (b) What are the different memory access methods? [5]
    (c) Give five differences between SRAM and DRAM [5]
11. (a) What do you mean by FPGA? Name some manufacturers of FPGA. [5]
    (b) Explain the architectural design in FPGA. [5]
    (c) Mention the applications of FPGA. [5]