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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) In what aspect, HDLs differ from other computer programming languages?

(ii) How we can realize a full adder?

(iii) The R-S latch is a_____.

(iv) What is the storage cell of DRAM made of?

(v) Which is the fastest RAM?

(vi) Convert $(7A)_{16}$ into a BCD number.

(vii) What are the three output conditions of a tri-state buffer?

(viii) What do you mean by Figure of Merit of a Digital IC?

(ix) VHDL stands for _____.

(x) Name a self-complementing code.

(xi) Which adder is an example of sequential circuits?

(xii) Radio frequency integrated circuit (RFIC) is a sub-type of which IC?

Group-B (Short Answer Type Question)

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

2. How many types of number systems are there? What are the applications of the octal and hexadecimal number systems? [5]
3. What is VHDL? State the features of VHDL. [5]
4. Why NAND and NOR are known as universal gates? Design EXOR gate using NAND & NOR gates. [5]
5. Design a circuit of a 4-bit parallel adder subtractor. [5]
6. Classification of Integrated Circuits. [5]

Group-C (Long Answer Type Question)

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

7. (a) What are the languages that are combined together to get the VHDL language? What are the VHDL structural elements? [5]
   (b) What is an entity in VHDL? Name the different abstraction levels in VHDL. [5]
   (c) What is architecture in VHDL? [5]
8. (a) Design a full adder using MUX. [5]
   (b) Design a full adder using Decoder. [5]
   (c) Design a full adder using a NAND gate. [5]
9. (a) Design a 4-Bit Synchronous Up/Down Counter using JK flip-flops. [5]
   (b) What are the different types of Finite state machines? [5]
   (c) Compare Moore and Mealy machines. [5]
10. (a) Design Decimal to BCD encoder. [5]
    (b) Mention the drawbacks and uses of the encoders. [5]
    (c) Design a 4:2 Priority Encoder. [5]
11. (a) Design a 4-Bit Synchronous Down Counter using JK flip-flops. [5]
    (b) What are the steps involved in sequence generator? [5]
    (c) Compare Asynchronous Sequential circuits and Synchronous Sequential circuits. [5]