

6. What are different types of operators in VHDL? Write the operator precedence table. Write a VHDL program to illustrate the logical shift operation.  $3+3+4=10$
7. Design a 4:1 MUX using 2:1 MUXs. Write the corresponding VHDL program.  $5+5=10$
8. Write short notes on any two.  $5 \times 2=10$
- (i) Floating point numbers.
- (ii) Arithmetic logic unit.
- (iii) Control logic.

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## M. Tech Odd Semester Examination, February, 2023

### Electronics & Communication Engineering (3rd Semester)

Course No.: MECE-301A  
(Hardware Description Language)

*Full Marks: 50*

*Pass Marks: 25*

*Time: 2 hours*

- Note:**
1. Attempt any five questions.
  2. Begin each answer in a new page.
  3. Answer parts of a question at a place.
  4. Assume reasonable data wherever required.
  5. The figures in the right margin indicate full marks for the question.
  6. All the mathematical symbols and abbreviations have their usual meanings.
1. Design a 4-bit adder/subtractor and write the corresponding VHDL program using structural modelling style.  $4+6=10$
  2. How different types of delay are modelled in VHDL? Explain each of them with suitable example of VHDL codes.  $5+5=10$
  3. What are the different modelling styles in VHDL? Write a VHDL program to illustrate the mixed modelling style.  $2+8=10$
  4. What do you mean by state machines? Write VHDL programs for Moore and Melay machines.  $(3+3)+4=10$
  5. Write a VHDL program using process statement to design a negative edge triggered D-type flip-flop with direct preset and reset inputs. Using the same design a 4-bit shift register.  $6+4=10$