

**II B. TECH II SEMESTER REGULAR EXAMINATIONS, JUNE - 2022**  
**DIGITAL SYSTEM DESIGN WITH VHDL**  
**(ELECTRONICS AND COMMUNICATION ENGINEERING)**

Time: 3 hours

Max. Marks: 70

**Note:** Answer **ONE** question from each unit (**5 × 14 = 70 Marks**)

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UNIT-I

1. a) Discuss about the fastest logic family and mention the typical [7M]  
values of its various parameters.
- b) Explain the circuit behavior of CMOS with non ideal outputs. [7M]  
And compare the CMOS logic families.

(OR)

2. a) Explain what is meant by logic family? Construct an Ex-NOR [7M]  
circuit using CMOS transistors and explain its operation.
- b) Explain the terms: (i) DC noise margin (ii) Fan-out with [7M]  
reference to TTL gate.

UNIT-II

3. a) With suitable example explain PROCESS statement in VHDL. [7M]
  - b) What are the various types of objects in VHDL? Explain. [7M]
- (OR)
4. a) Discuss about VHDL synthesis. [7M]
  - b) Explain the packages and libraries of VHDL. [7M]

UNIT-III

5. a) Explain Null, Next, Assertion, and Wait statements. [7M]
- b) Explain about variable assignment statement, signal [7M]  
assignment statement, wait statement.

(OR)

6. a) Explain the difference in program structure of VHDL and any [7M]  
other procedural language. Give an example.
- b) Explain the structure of various LOOP statements in VHDL with [7M]  
examples.

UNIT-IV

7. a) Implement the 32 input to 5 output priority encoder using four [7M]  
74LS148 gates.
- b) Develop a VHDL code of 4-bit ALU with three select lines to [7M]  
select various functions.

(OR)

8. a) Design a 32x1 multiplexer by using 74x151 IC and explain its operation. [7M]  
b) Design a two bit comparator circuit and explain its operation. [7M]

UNIT-V

9. a) Draw and explain in detail about 4-bit Johnson Counter using VHDL. [7M]  
b) Write a VHDL code for 8-bit ring counter. [7M]

(OR)

10. a) Explain the operation of 8-bit serial in parallel out shift register and give VHDL description. [7M]  
b) Write a VHDL code of Sequence detector for any specific binary 3-bit stream with overlapping pattern. [7M]

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