

**DIGITAL IC APPLICATIONS**

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Classify the logic family by operation.
  - Which is the fastest logic gate? And why?
  - What is the necessity of simulation? Mention different types of simulation.
  - Explain primary constructs in VHDL?
  - List the applications of multiplexers and demultiplexers.
  - Why totem pole outputs cannot be connected together?
  - What is race around condition?
  - Define setup time and hold time.
  - Define PLD. Give its classification.
  - Define ROM and programmable logic array. Differentiate them.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 (a) What is the necessity of separate interfacing circuit to connect CMOS gate to TTL gate? Draw the interface circuit and explain the operation.  
 (b) Explain how a CMOS device is destroyed.

**OR**

- 3 (a) Discuss about CMOS dynamic electrical behavior with characteristics.  
 (b) Mention the DC noise margin levels of ECL 10K family.

**UNIT – II**

- 4 (a) Explain the difference in program structure of VHDL and any other procedural language. Give an example.  
 (b) Explain the behavioural design model of VHDL.

**OR**

- 5 (a) Write a process based VHDL program for the prime-number detector of 4-bit input and explain the flow using logic circuit.  
 (b) What is the importance of time dimension in VHDL? Explain its function.

**UNIT – III**

- 6 (a) Design a 10 to 4 encoder with inputs 1- out of 10 and outputs in BCD. Provide the data flow style VHDL program.  
 (b) Explain about combinational multipliers.

**OR**

- 7 (a) Design a full subtractor with logic gates and write VHDL data flow program for the implementation of the above subtractor.  
 (b) Describe three state devices.

**UNIT – IV**

- 8 (a) Describe dual parity encoder.  
 (b) Design a conversion circuit to convert a D flip-flop to J-K flip-flop? Write data-flow style VHDL program.

**OR**

- 9 (a) Design an 8-bit serial-in and parallel-out shift register with flip-flops. Explain the operation with the help of timing waveforms.  
 (b) Write VHDL data-flow program for the above shift-register.

**UNIT – V**

- 10 (a) Explain the internal structure of 64Kx1 DRAM. With the help of timing waveforms discuss DRAM access.  
 (b) Explain the functional behavior of Static RAM cell.

**OR**

- 11 (a) With the help of timing waveforms, explain read and write operations of static SRAM.  
 (b) Discuss how PROM, EPROM and EEPROM technologies differ.

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