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Total No. of Questions: [09]

Total No. of Printed Pages: 1

B. Tech. (Electrical Engg.) (Semester – 4th)
DIGITAL ELECTRONICS
Subject Code: BELES1401
Paper ID: [18111515]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a. List the basic logic gates and their symbols.
- b. How are errors detected using parity bits?
- c. Convert the octal number 157_8 into its decimal and hexadecimal equivalent.
- d. What is the purpose of a K-map in logic design?
- e. Explain the working principle of a BCD adder.
- f. Elucidate the difference between one's and two's complement with the help of an example.
- g. Define the term 'Ring Counter.'
- h. Describe programmable logic array (PLA).
- i. Differentiate between ROM and RAM.
- j. Calculate the resolution of a 10-bit A/D converter with a full-scale input range of 0 to 10V.

Section – B

(5 marks each)

- Q2. Explain the working of JK flip-flop with the help of a truth table and timing diagram.
- Q3. Discuss the working of multiplexers and demultiplexers, and show how a 4-to-1 multiplexer works.
- Q4. Differentiate between half-adder and full-adder.
- Q5. Explain the operation of a 4-bit shift register for converting data from serial to parallel and parallel to serial.
- Q6. Explain how PLA and PAL are used to implement logic circuits with an example.

Section – C

(10 marks each)

- Q7. (a) Design a 4-variable K-map for the function $F(A, B, C, D) = \Sigma(0, 1, 3, 7, 9, 11, 15)$ and show the minimized Boolean expression.
(b) Represent the decimal number 27 in binary form in
i) BCD code ii) Excess-3 code iii) Gray code iv) Hexadecimal code
- Q8. Describe the synchronous and asynchronous (ripple) counters' designs and methods of operation. Also, design a 4-bit synchronous up/down counter and use timing diagrams to illustrate its working.
- Q9. Explain the working principle and architecture of an Analog-to-Digital Converter (ADC) using the successive approximation method. Provide a step-by-step explanation of the conversion process and solve an example to demonstrate the working.