

BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
F.Y.B.Sc.(Computer Science) Sem-I : WINTER :- 2021
SUBJECT: PRINCIPLES OF DIGITAL ELECTRONICS-I

Day : Saturday
Date 29-01-2022

W-20071-2021

Time : 10:00 AM-01:00 PM
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of log table and scientific calculator is allowed.

Q.1 Answer **ANY TWO** of the following. (12)

- a) State and prove De-Morgans theorem.
- b) Obtain the single error correcting code for the BCD number 1010 using even parity.
- c) Define Decoder. Explain with necessary diagram 3:8 decoder.

Q.2 Answer **ANY TWO** of the following (12)

- a) Reduce the following four variable functions to its minimum sum of product form, plot the following Boolean functions on K-map
 $F = \sum (0,3,4,5,6,8,10,12)$
- b) Explain the working of full adder circuit with its logic diagram and truth table.
- c) Explain 4:1 multiplexer with logic diagram, logic symbol and truth table.

Q.3 Answer **ANY TWO** of the following (12)

- a) Using only NOR gates build AND, OR and EX-OR gates.
- b) Simplify the following Boolean equation and then draw logic diagram and write truth table
 $Y = ABC\bar{C} + ABC + BC$
- c) What is an encoder? Explain decimal to BCD priority encoder.

Q.4 Answer **ANY THREE** of the following (12)

- a) Construct NOT gate and AND gate using NAND gate only.
- b) Perform the following conversions:
 - i) $(11101101)_2 = \text{Gray code}$
 - ii) $(162.23)_{10} = (?)_8$
- c) State various laws of Boolean algebra.
- d) Draw well labelled diagram of 1:4 demultiplexer. Also write its truth table.

Q.5 Answer **ANY FOUR** of the following (12)

- a) Explain the following parameters of logic families:
 - i) Operating speed
 - ii) Power dissipation
 - iii) Fan-Out
- b) Simplify the following Boolean equation and then draw logic diagram and truth table
 $Y = ABC\bar{C} + AB + BC + A$
- c) Plot K-map for Boolean expressions
 - i) $Y = (A + B + C + \bar{D})(A + B + \bar{C} + \bar{D})(\bar{A} + \bar{B} + \bar{C} + D)$
 - ii) $Y = AB\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + AB\bar{C}\bar{D} + ABC\bar{D} + ABC\bar{D}$
- d) Draw logic diagram for 2:1 multiplexer. Also write truth table for it.
- e) Convert $(132.25)_{10}$ into binary and octal number.
- f) Reduce the following Boolean expression and draw logic diagram:
 $[A\bar{B}(C + BD) + \bar{A}\bar{B}] C$

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