

BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
F.Y.B.Sc.(Computer Science) Sem-I :SUMMER- 2022
SUBJECT : PRINCIPLES OF DIGITAL ELECTRONICS-I

Day : Thursday
Date : 14-07-2022

S-20071-2022

Time : 11:00 AM-02:00 PM
Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw diagrams **WHEREVER** necessary.
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Q.1 Answer **ANY TWO** of the following: **(12)**

- a) Solve the following using Karnaugh map:
 $Y = \Sigma m(2,3,4,8,10,11,12,14)$
- b) Define encoder with logic diagram. Explain octal to binary encoder with necessary diagram.
- c) State and explain De-Morgan's theorems.

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

- a) Explain the working of 4:1 multiplexer with necessary diagram.
- b) Explain basic gates with symbol, Boolean equation and truth table.
- c) Determine the single error-correcting code for the information code 10011 for the odd parity.

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

- a) Give any five Boolean postulates and simplify the following expression
Boolean algebra: $A + \overline{AB} = A + B$
- b) What is a decoder? Explain BCD to decimal decoder with necessary diagram.
- c) Explain the working of 4-bit parallel adder with the help of a neat diagram.

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

- a) Subtract the following using 2's complement method:
 $(10001)_2 - (11100)_2$. Also comment on the result.
- b) Draw the symbol and give the truth table for:
i) 2- input NAND gate **ii)** 2- input NOR gate
- c) Subtract $(47)_{10}$ from $(78)_{10}$ using 2's complement method.
- d) Draw logic diagram for decimal to BCD encoder. Write the truth table for the same.

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

- a) Perform the following conversions:
i) $(10101111)_2 = (?)_{10}$ **ii)** $(38.21)_{10} = (?)_2$
iii) $(4A8C)_{16} = (?)_2$
- b) State and explain any two parameters of logic families.
- c) Draw diagram for 1:2 demultiplexer and also write truth table for it.
- d) Explain the concept of analog multiplexer.
- e) Simplify the following Boolean equation and then draw logic diagram:
 $Y = \overline{ABC} + \overline{ABC} + \overline{BC}$
- f) Minimize the expression:
 $Y = \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC}$