

**F.Y. B. SC. (COMPUTER SCIENCE) SEM – I (CBCS - 2016
COURSE) : SUMMER - 2018**

SUBJECT : PRINCIPLES OF DIGITAL ELECTRONICS - I

Day : **Wednesday**
Date : **25/04/2018**

S-2018-0797

Time : **11.00 A.M. TO 02.00 PM**
Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable calculator is allowed.

Q.1 A) Select the correct option and rewrite the complete sentence. **(06)**

- a) According the Boolean algebra laws $(A \cdot B) \cdot C = \underline{\hspace{2cm}}$.
i) $(A \cdot B) \cdot C$ ii) $A \cdot (B \cdot C)$ iii) $(A \cdot C) \cdot B$ iv) $(AB) \cdot C$
- b) number system has base 8.
i) Hexadecimal ii) Binary iii) Octal iv) BCD.
- c) DTL stands for .
i) Direct transistor logic ii) Diode transistor logic iii) Diode transfer logic
iv) Direct transfer logic.
- d) Gray code for 1110 is .
i) 111011 ii) 1001 iii) 0001 iv) 000111
- e) Conversion of $(0.357)_{10}$ to hexadecimal equivalent is .
i) 0.5C6 ii) 0.5B6 iii) 0.5D6 iv) 0.556.
- f) Addition of binary addition 110101 and 100101 is .
i) 1011010 ii) 0011010 iii) 1010010 iv) 0011000.

B) Answer all the questions in one sentence. **(06)**

- a) Draw the logic diagram of half adder.
- b) What is a multiplexer?
- c) Define an encoder.
- d) State the difference between half adder and full adder.
- e) What is positive and negative logic?
- f) Draw symbol for two input bubbled OR gate.

Q.2 Answer any **THREE** of the following: **(12)**

- a) Explain the working of full adder with logic diagram, symbol and truth table.
- b) State and explain De-Morgan's theorems.
- c) With neat logic diagram and truth table explain the working of 1:4 multiplexer.
- d) Simplify the following four variable functions to its minimum sum-of-product form.

$$Y = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + \bar{A}\bar{B}CD + \bar{A}BCD + A\bar{B}C\bar{D} + \bar{A}BC\bar{D} + ABC\bar{D} + A\bar{B}C\bar{D}$$

P.T.O.

- Q.3** Answer any **FOUR** of the following: (12)
- Give symbol, Boolean equation and truth table for AND and NAND gates.
 - Define the following terms for logic families **i)** Speed of operation **ii)** Power dissipation **iii)** Fan-out.
 - Draw logic diagram and symbol for half adder.
 - Reduce the following Boolean expression and draw the logic diagram $AB+A(B+C)+BC(B+C)$.
 - State any three laws of Boolean algebra.
- Q.4** Answer any **TWO** of the following: (12)
- With neat diagram explain the working of 1:8 demultiplexer. Also write truth table for it.
 - Simplify the following Boolean equation and then draw logic diagram and truth table for it $Y = ABC\bar{C} + ABC + BC$.
 - Explain decimal-to-BCD priority encoder with logic diagram and truth table.
- Q.5** Answer any **TWO** of the following: (12)
- What is a decoder? Explain the working of 1:4 decoder with logic diagram and truth table.
 - Plot the following Boolean function on K-map and also simplify it $F=\sum(0,3,4,5,6,8,10,12)$
 - Perform the following conversion $(1010111001011)_2=(?)_{16}$.
 - Find the Hamming code for the number 1001 using even parity.

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