

**F.Y. B. SC. (COMPUTER SCIENCE) SEM – I (CBCS - 2016  
COURSE) : WINTER - 2017  
SUBJECT : PRINCIPLES OF DIGITAL ELECTRONICS - I**

Day : **Tuesday**  
Date : **07/11/2017**

**W-2017-0705**

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  $A + A = \underline{\hspace{2cm}}$ .  
i) A    ii) 1    iii)  $\bar{A}$     iv) 2A
- b) The universal gate/gates is/are                     .  
i) NAND    ii) NOR    iii) both (1) and (2)    iv) None.
- c) Hex equivalent of binary number 1100111.110110 is  
i) 303.312    ii) 147.66    iii) 67.D8    iv) None.
- d)                      LED's should glow in order to display 4 on seven segment display.  
i) bc fg    ii) bc    iii) ab    iv) abc fg.
- e)                      8 to 1 multiplexer IC chips are required to build 32 to 1 multiplexer from 8 to 1 multiplexer  
i) 2    ii) 4    iii) 3    iv) 6.
- f)                      is a circuit that converts coded input to familiar codes.  
i) decoder    ii) encoder    iii) Multiplexer    iv) adder.

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

- a) Convert  $(10101)_2$  to gray code.
- b) Draw logic diagram for  $\bar{A}B + BC$ .
- c) Write full forms of: TTL and CMOS
- d) Find the number of select lines required in 64 to 1 multiplexer.
- e) What do you mean by priority encoder?
- f) Write truth table for NOT gate.

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

- a) Perform the following conversions: **i)**  $(1000.110)_2 = (?)_{10}$     **ii)**  $(35.82)_{10} = (?)_8$
- b) Explain 2:1 multiplexer with neat circuit diagram and truth table.
- c) Draw circuit symbols and write truth tables of following gates.  
AND, EXOR, NAND, OR
- d) Simplify the following Boolean expression using K-map and draw simplified logic diagram  
 $Y = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + \bar{A}\bar{B}C + ABC$

P.T.O.

- Q.3** Answer any **FOUR** of the following: (12)
- a) Explain the working of 1 of 4 decoder with neat logic diagram and truth table.
  - b) What do you mean by weighted and unweighted codes? Find excess -3 code and BCD code for decimal number 472.
  - c) Explain the concept of tristate logic using proper diagram.
  - d) State and prove De Morgan's first theorem.
  - e) Convert the following SOP expression into standard SOP form  
$$Y = AB + AC + B\bar{C}$$

- Q.4** Answer any **TWO** of the following: (12)
- a) What do you mean by error detecting codes? Construct Hamming code for message 1101 for even parity.
  - b) Explain operation of decimal to BCD encoder with neat circuit diagram and truth table.
  - c) With proper logic diagrams explain how NAND gate can be used to convert to AND, OR and EX-OR gates.

- Q.5** Answer any **TWO** of the following: (12)
- a) Perform  $(11010)_2 - (1100)_2$  using rules of binary subtraction and also using 2's compliment method.
  - b) Explain working of full adder with proper circuit diagram and truth table.
  - c) Explain how to construct 16:1 multiplexer using 4:1 multiplexer by using tree multiplexing concept.

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