II Semester Diploma Examination, November 2010

E & C BOARD

DIGITAL ELECTRONICS – I

Time : 3 Hours

Max. Marks : 100

Instructions : (1) Section – I is compulsory.

(2) Answer any six full questions choosing any two full questions from Section II, III & IV.

SECTION – I

1. (a) Fill in the blanks:

   (i) A max-term Boolean Expression is also called _____ form.

   (ii) _____ two-Input Nand gates must be used to produce two input NOR-function.

   (iii) The excess 3 code number 10010011 equals in _____ in decimal.

   (iv) The most important advantage of using CMOS is its _____ power consumption.

   (v) A _____ TTL input is equivalent to a HIGH Input.

(b) Explain ASCII code.

   5 x 1 = 5

SECTION – II

2. (a) List seven advantages of using Digital Systems.

(b) Find the equivalent of

   (i) \((3E6)_{16} = ( \_ )_{10}\)

   (ii) \((4095)_{10} = ( \_ )_{16}\)

(c) Find the equivalent of

   (i) \((156)_{8} = ( \_ )_{10}\)

   (ii) \((391)_{10} = ( \_ )_{8}\)

   7

   4

   4

[Turn over]
3. (a) Draw the logic diagram and truth table for
   (i) a two input AND gate
   (ii) a two input OR gate

   (b) Realize
   (i) EX-NOR using NAND gates

   (c) List three applications of EX-OR gate.

4. (a) Simplify
   \[ XY + x(y + z) + y(y + z) \]
   using Boolean techniques.

   (b) Apply De-morgans’ theorem
   (i) \[ \overline{A + B} + C \]
   (ii) \[ \overline{A + B} + \overline{C} \]

   (c) Subtract \((11100)_2\) from \((10011)_2\) using two’s complement method.

SECTION – III

5. (a) With block diagram explain the operation of a two-2 bit parallel adder.

   (b) Differentiate between ENCODER and DECODER.

   (c) Write logic symbol, truth table and logic diagram of full subtractor.

6. (a) Write the logic gate diagram of \(1 \times 4\) Demultiplexer.

   (b) List four applications of multiplexer.

   (c) Draw the k-map for the following minterm and simplify
   \[ Y = \Sigma 2, 3, 5, 6, 7, 9, 11, 13. \]
   Consider the variables as A, B, C, & D.

7. (a) Differentiate between ENCODER and priority ENCODER.

   (b) Explain \(1 : 8\) demultiplexer with circuit diagram and Truth Table.

   (c) Explain the difference between MUX and DEMUX.
SECTON – IV

(a) What do you mean by the following?
(i) LATCH
(ii) Level clocking
(iii) Master-slave triggering
(iv) Toggle
(v) Edge-Triggering
(vi) Race-condition

(b) List three applications of a flip-flop.

(c) Define the terms:
(i) SSI
(ii) MSI
(iii) LSI
(iv) VLSI

(b) List five characteristics of ECL family of logic cks.

(c) What is fan-in?

10. (a) With NAND gates logic diagram explain the operation of checked D-flip flop.

(b) What do you mean by the following?
(i) Gate
(ii) truth-table
(iii) don’t care
(iv) Redundant Group
(v) QUAD