Code : 9EC-02-E

Register Number | | | | | | | |

I Semester Diploma Examination, May 2011

ELECTRONICS & COMMUNICATION ENGG. BOARD

DIGITAL ELECTRONICS – I

: 3 Hours] **[Max. Marks : 100**

ictions : (1) Section – A is *compulsory*.

(2) Answer any ***two*** main questions from each of the remaining Sections – B, C & D.

SECTION – A

1. (a) Fill in the blanks : **5 × 1 = 5**
   (i) A 2 input OR gate has an output '0' when both its inputs are _____.
   (ii) The radius of octal number system is _____.
   (iii) _____ circuit converts serial data into parallel data.
   (iv) _____ flip flop is formed by adding an inverse between the two inputs of SR flip-flop.
   (v) TTL stands for _____.

   (b) Explain De-Morgan's theorems. **5**

SECTION – B

2. (a) Perform the following conversions : **5 × 2 = 10**
   (i) Hexadecimal number EF3E into decimal.
   (ii) Decimal number 324.12 into binary.
   (iii) Octal number 425.76 into hexadecimal.
   (iv) Binary number 11101 into Gray code.
   (v) Binary number 10101.10 into decimal.

   (b) Multiply $(1010.10)_2 \times (101)_2$ **3**

   (c) What is BCD code ? Mention its application. **2**

3. (a) Write the logic symbol, expression and truth table for the following gates : **6**
   (i) EX-NOR
   (ii) OR

   (b) Subtract $(1101)_2$ from $(1010)_2$ using 2's complement method. **2**

   (c) List the difference between analog and digital signals. **3**

   (d) Realise (i) NAND gate (ii) OR gate using NOR gates only. **4**

[Turn over

4. (a) Define the following terms with reference to logic families.
   (i) Fan-in
   (ii) Fan-out
   (iii) Noise margin

   (b) Simplify the following expression using K-map and draw the logic circuit for the reduced expression.

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

   (c) Simplify the expression

$$Y = (\bar{A} + B)(\bar{A} + \bar{B})(A + C)$$

   Using Boolean algebra

SECTION – C

5. (a) Explain the working of full adder circuit with logic diagram and truth table.
   (b) Explain decimal to BCD encoder with logic symbol and truth table.

6. (a) What is demultiplexer ? Explain 1 : 4 demultiplexer using gate level circuit and truth table.
   (b) Explain 2-bit magnitude comparator with gate level circuit and truth table.

7. (a) Explain BCD to decimal decoder with neat logic diagram.
   (b) Explain the functioning of 8 : 1 multiplexer with block diagram and truth table.

SECTION – D

8. (a) Explain the operation of SR flip flop with neat logic circuit and truth table.
   (b) Realist master slave JK flip flops using NAND gates only and write truth table.

9. (a) Define counter. Explain the modulus of counter.
   (b) Explain the working of four bit synchronous counter with truth table and binary diagram.
   (c) List the applications of counter.

10. (a) Explain the working of 4-bit SISO shift register with logic diagram and truth table.
    (b) Explain the working of Johnson counter with binary diagram and truth table.