I Semester Diploma Examination, November 2011

E & C BOARD

DIGITAL ELECTRONICS

[Max. Marks: 100]

Instructions:
(1) Section – A is compulsory.
(2) Answer any two full questions from each of the remaining Sections – B, C & D.

SECTION – A

(a) Fill in the blanks with appropriate answers:
(i) The number that comes immediately after $(\text{FFEF})_{16}$ is ________.
(ii) A logic gate which outputs a high only when the two inputs are different is ________.
(iii) A high when logically ANDed with a high results in ________.
(iv) Combinational logic circuit does not have ________ capability.
(v) Number of Flip Flops required for Mod-13 counter are ________.

(b) Compare TTL logic family with CMOS.

$5 \times 1 = 5$

SECTION – B

2. (a) Convert $(11001.0101)_2$ to decimal.
(b) Explain the concept of 2’s complement for a decimal number.
(c) Explain the 2-input exclusive or gate with truth table.

3. (a) Find out the octal equivalent of $(2F.C4)_{16}$ and $8AB$.
(b) Implement NOT and or gate using universal (NAND) gate.
(c) Perform the following operations.
   (i) Multiply $11.110$ and $100.1$
   (ii) Subtract $1011$ from $1100$ using 2’s complement
   (iii) BCD equivalent of 83.
4. (a) Mention the steps involved in Binary to Gray code conversion with an example.
(b) List & explain any 3 laws of Boolean Algebra.
(c) Define Fan-Out, Propagation delay.

SECTION – C

5. (a) Define a combination circuit.
(b) Explain a half adder circuit with truth table.
(c) Design a two bit magnitude comparator with its relevant Boolean expression.

6. (a) Define a multiplexer. Explain the gate level circuit operation of a 2:1 multiplexer.
(b) What is an encoder? And define priority encoder.
(c) Compare & contrast sequential logic & combinational logic circuit.

7. (a) Explain the operation of a BCD to Decimal Decoders with truth table.
(b) Explain the working of Binary Decimal Encoder.
(c) Compare serial adder with parallel adder.

SECTION – D

8. (a) Mention some of the applications of flip flops.
(b) Define:
   (i) Propagation delay in ripple counter.
   (ii) Modulus of a counter.
(c) Explain a 4-bit SISO shift register using flip-flop with its timing diagram & truth table.

9. (a) Mention the differences between synchronous & asynchronous counter.
(b) What is shift register? List some of its applications.
(c) Explain the operation of a decade counter with the truth table.

10. (a) List out the applications of counters.
     (b) Explain the operation of Mod-5 counter with timing diagram.
     (c) Draw the gate level circuit of J.K. flip-flop with preset & clear inputs & explain its operation with the help of truth table.