Roll. No………………………… 1211006

B.Tech 1st Semester Examination
Basic Electronics
Subject Code: ECL-100

Time Allowed: 03 hours. Maximum Marks: 100

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Attempt any five questions and all questions carry equal marks.

Section – A

1. (a) Differentiate between diffusion current and drift current. (5)
(b) Derive an expression for current density in a semiconductor. (5)
(c) Draw and explain the V-I characteristics of a PN junction diode. (5)
(d) Convert (i) $A2B6 = (?)_2$ (ii) $(1101111011.01011)_2$ to $(?)_{16}$. (5)

2. (a) What is a B.J.T. Differentiate between C.B, C.E working of Tx. (5)
(b) Draw the input and output characteristics of Tx in C.E mode. (10)
(c) Derive the relationship between $\alpha$ and $\beta$ in Tx. (5)

3. (a) What are Barkhausen conditions for oscillation? (2)
(b) Explain the working of a crystal oscillator. (8)
(c) Derive the expression of gain of an amplifier with negative feedback (volt-series). (5)
(d) What is a cascade amplifier? What is the total gain of three (3) amplifiers connected in cascade each having a voltage gain of ten (10). (5)

Section – B

4. (a) Realize AND or EX-OR gate using NOR and NAND gates. (6)
(b) Making use of Karnough mapping procedure simplify the following expression:-
$$F(ABCD) = BC'+A'B+BCD'+A'B'D+AB'C'D$$ (12)
(c) Give truth table of EX-NOR gate (2)

5. (a) Explain (i) CMRR (ii) Slew Rate (iii) PSRR (iv) virtual ground in OP-AMP. (6)
(b) Realize the OP-AMP as differentiator graphically show the output of a a differentiator OP_AMP with Sq. wave input. (8)
(c) Draw the block diagram of a digital voltmeter. (6)

6. (a) draw the block diagram of a CRT, explain how focusing and intensity control is obtained. (10)
(b) Differentiate between linear regulated voltage supply and SMPS. (5)
(c) what is a U.P.S differentiate between “ON” line and” Off” line U.P.S through a diagram (5)