Basics of 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) What is difference between Intrinsic and Extrinsic semiconductor? What is Doping? (7)

(b) Draw the V-I characteristics of a Diode with the help of Diode Equation. Explain Reverse Saturation current. (7)

(c) Differentiate between Zener and Avalanche Breakdown. (6)

2. (a) Define $\alpha$ and $\beta$ in a Transistor. Derive the relationship between $\alpha$ and $\beta$. (7)

(b) Draw the input output characteristics of an NPN Transistor Amplifier in Common Emitter mode. (7)

(c) A BJT has a base current of 200 $\mu$A and emitter current of 20mA. Determine the collector current and $\beta$. (6)

3. (a) Describe with a labeled diagram working of a Hartley Oscillator. Explain how the oscillations are maintained in this oscillator. (10)

(b) What are the advantages of a crystal Oscillator? Draw the electrical equivalent circuit of a crystal and how its Impedance varies with frequency. (7)

(c) State and explain Barkhausen mode condition for Oscillations. (3)

Section – B

4. (a) Simplify the Boolean function by using K-map method.

$$F(ABCD)=\Sigma(0,1,2,5,6,7,8,9,10,14)$$ (10)

(b) Design Ex-Nor gate using NAND gate. (5)

(c) Convert the following

(i) $(9AF)_{16} \rightarrow (\ldots\ldots\ldots)_{8}$

(ii) $(472)_{8} \rightarrow (\ldots\ldots\ldots)_{16}$ (5)

5. (a) Draw the block diagram of CRT and Explain its working. (10)

(b) Explain the working of Function Generator. (6)

(c) Differentiate between Online and Offline modes in UPS. (4)

6. (a) Draw the circuit diagram of a Non Inverting Amplifier. Explain its working and Derive the Expression for the voltage gain. (10)

(b) Discuss the characteristics of an Ideal OP AMP. (6)

(c) Define Slew rate. PSRR. Input Offset voltage and CMRR. (4)