(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

THIRD SEMESTER [B.TECH] DECEMBER 2024

Paper Code: ECC-215 **Subject: Electronics-I**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Attempt **any Four** of the following Questions. **(4x5=20)**

(a) Draw the energy band for Metal, Semiconductor and Insulator.

(b) Write the difference between Direct band semiconductor and Indirect band semiconductor.

(c) A diode has leakage current of 5μA at 10 °C. Find its value when the temperature is 35 °C.

(d) Write short notes on Zener diode and draw the V-I characteristics.

(e) Draw and write the operation of npn transistor in active region.

(f) Reduce the following Boolean fiction using Boolean algebra.

$$F = AB + \bar{A}B + BC$$

(g) Draw and explain the Full Adder.

(h) Write the difference between Synchronous Counter and Asynchronous Counter.

Q2 A pure semiconductor (Ge) is doped with donor impurities to the extent of 10^7. FindDonor concertation, Electron concentration, Hole concentration And Conductivity of the doped semiconductor. **(10)**
(Assume: Total number of atoms in Ge is $4.4\text{x}10^{23}$ cm^{-3}. n_i=$2.5\text{x}10^{13}$ $Atom/cm^{-3}$, μ_n=3800 cm^2/V-Sec, μ_p=1800 cm^2/V-Sec).

OR

Q3 Explain working of Tunnel diode with V-I characteristics and suitable diagrams. **(10)**

Q4 Explain Half wave rectifier and full wave rectifier with suitable circuit diagram and waveform. **(10)**

OR

Q5 Explain working of Common Emitter (CE) configuration of npn transistor with suitable diagrams. Also draw the input and output characteristics. **(10)**

Q6 Write the operation of N-Channel enhancement MOSFET and depletion MOSFET with suitable block diagram and V-I characteristics. **(10)**

OR

Q7 Reduce the following Boolean function using K-map. **(10)**

$$f(A,B,C,D) = \sum m(0,1,3,5,9,11,13) + \sum d(7,10,15)$$

Q8 Draw and explain Carry Look-ahead Adder in detail. **(10)**

OR

Q9 What is J-K Flip-flop? What is Race around condition in J-K flip-flop and how it can overcome? **(10)**

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