Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–I • EXAMINATION – WINTER 2013

Subject Code: X11101 **Date: 21-12-2013**

Subject Name: Basic Electronics

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define following terms: **07**

1. Electron Volt
2. Photo ionization
3. Photo excitation
4. Mean lifetime of a carrier
5. Mass action law
6. Intrinsic semiconductor
7. Extrinsic semiconductor

(b) Write short note: Potential Energy Barrier between two electrodes. **07**

Q.2 **(a)** Explain Hall Effect. Derive expression of Hall voltage and state its applications. **07**

(b) A 1mm long bar of silicon is doped with donor impurity of $5x10^{10}$ / cm^3. Find the voltage drop across the bar if the current density within the bar is 1mA / cm^2. Given : for Si at 300^0 K, $n_i=1.5x10^{10}/cm^3$, $\mu_n=1300cm^2/V\text{-}sec$, $\mu_p=500$ cm^2/ V-sec. **07**

OR

(b) Derive expression for Continuity Equation. **07**

Q.3 **(a)** What is Transition Capacitance? Derive its expression with suitable diagram. **07**

(b) Derive expression for diode Static and Dynamic resistance. **07**

OR

Q.3 **(a)** Explain construction, working and application of Varactor Diode. **07**

(b) With suitable waveforms explain Junction Diode Switching Time. **07**

Q.4 **(a)** Write principle and application of Light Emitting Diode. **07**

(b) Explain the h-parameter model of CE amplifier with bypass resistance R_E and derive expression for A_i, A_v, R_i and R_o. **07**

OR

Q.4 **(a)** Explain input and output characteristics of CB configuration of Transistor. **07**

(b) Explain the operation of Fixed Bias circuit. **07**

Q.5 **(a)** List out Bias Compensation techniques. Explain any three in detail. **07**

(b) Give construction details of JFET and draw and explain its characteristics. **07**

OR

Q.5 **(a)** Give comparisons between JFET & MOSFET. **07**

(b) Explain class A Push Pull Amplifier. **07**

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