

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 $5 \times 10^{10} / \text{cm}^3$. Find **07**
the voltage drop across the bar if the current density within the bar is $1 \text{mA} / \text{cm}^2$. Given : for Si at 300°K , $n_i = 1.5 \times 10^{10} / \text{cm}^3$, $\mu_n = 1300 \text{cm}^2 / \text{V-sec}$, $\mu_p = 500 \text{cm}^2 / \text{V-sec}$.
- 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**
