

GUJARAT TECHNOLOGICAL UNIVERSITY**P.D.D.C. Sem- I Regular / Remedial Examination January. 2011****Subject code: X11101****Subject Name: Basic Electronics****Date: 08 / 01 /2011****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) Explain the formation of potential barrier in a PN junction. Why silicon is preferred to germanium in the manufacturing of semiconductor devices? **07**
- (b) Explain the construction, working and characteristics of TUNNEL diode in detail. **07**
- Q.2** (a) Explain the biased positive clipper and biased negative clipper with reverse polarity of battery with necessary diagrams. **07**
- (b) I. Explain half-Wave rectifier in detail. **03**
II. Explain positive clamper circuit with necessary diagrams. **04**

OR

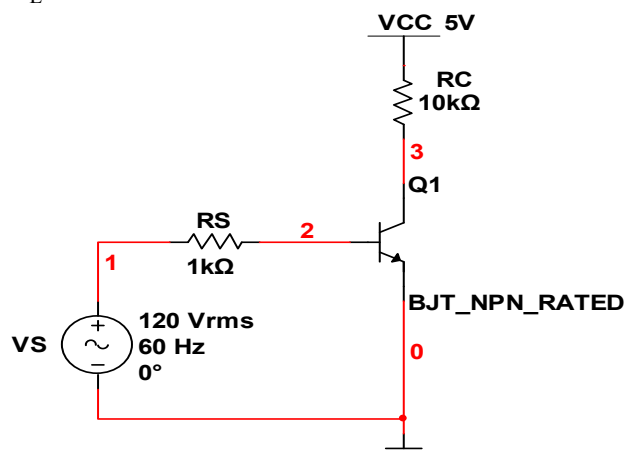
- (b) Determine the conductivity of intrinsic germanium at 300°K . If donor type impurity is added to the extent of 1 impurity atom in 10^7 germanium atoms, find the conductivity of N-type germanium. It is given that intrinsic concentration n_i at 300°K is $2.5 \times 10^{13}/\text{cm}^3$ and the values of μ_n and μ_p for germanium are $3800\text{ cm}^2/\text{V-s}$ and $1800\text{ cm}^2/\text{V-s}$ respectively and atoms/cm^3 are 3.41×10^{22} . **07**
- Q.3** (a) I. Give the definitions of following. **04**
(a) eV Unit (b) Mean life time (c) PIV of diode (d) PIV of JFET.
II. List down the electrical properties of semiconductor. **03**
- (b) Explain CE configuration I/P and O/P characteristics in detail. **07**

OR

- Q.3** (a) I. Derive relationship between α and β . **04**
II. What are the requirements of biasing circuit? Explain. **03**
- (b) Explain CB configuration I/P and O/P characteristics in detail. **07**
- Q.4** (a) Explain emitter follower in detail. **07**
- (b) Explain any one method of biasing single stage JFET amplifiers. **07**

OR

- Q.4** (a) Explain the working of N-channel enhancement type MOSFET. **07**
- (b) For the CE amplifier shown in **Fig: 2**, following data are given. **07**
 $h_{ie}=1.1\text{K}\Omega$, $h_{re}=2.5 \times 10^{-4}$, $h_{fe}=50$, $h_{oe}=24\mu\text{A/V}$. Calculate A_i , A_v , R_i , A_{is} and A_{vs} for $R_L=10\text{K}\Omega$.

**Fig: 2**

- Q.5 (a) I. State the various methods of improving stability. 03**
II. Why hybrid parameters are called so? Define them. **04**
(b) Explain diode diffusion and transition capacitance in detail. 07
- OR**
- Q.5 (a) I. Draw the piecewise linear circuit and characteristics for ideal model of diode and constant voltage drop model of diode. 04**
II. Explain FET as VVR. **03**
(b) Explain the working of push-pull amplifier. 07
