

B. Tech Second Year : 3rd Semester

Electronic Devices & Circuits, Jan., 2012

(FOR 3EC2 BRANCH OF ENGINEERING)

Times : 3 Hours Min. Passing Marks : 24 Total Marks : 80

Attempt overall five questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

Unit-I

1. (a) Describe the conductivity and mobility for intrinsic semiconductor. [8]
- (b) Find 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. Given that n_i at 300°K is $2.5 \times 10^{13}/\text{cm}^3$ and μ_n and μ_p of germanium are 3800 and $1800 \text{ cm}^2/\text{v-s}$ respectively. [8]

OR

1. (a) What is Hall effect, how it is useful for measuring various parameters of semiconductor? [8]
- (b) What do you mean by Fermi level? Derive the expression for fermi level and sketch the position in case of intrinsic, p-type and n-type semiconductor. [8]

Unit-II

2. (a) Draw and explain the working of DC inserter circuit. [8]
- (b) What do you mean by clipper circuit? The sinusoidal input given to below circuit, what will be the output : Fig.1? [8]

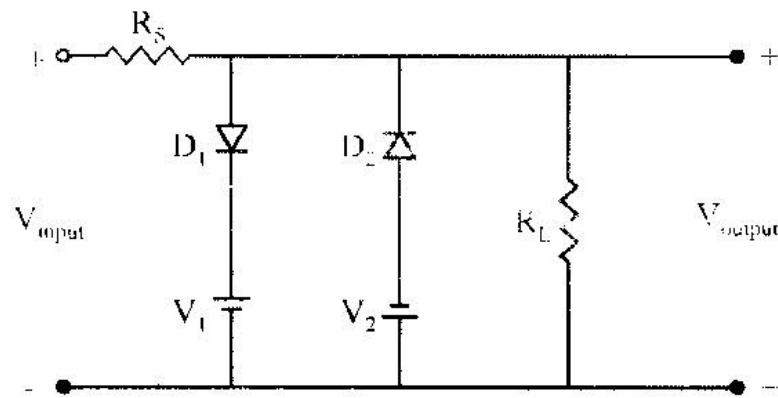


Fig. 1 [8]

OR

2. (a) Describe the importance of load line concept used in electronic circuits. [8]
- (b) Explain the effect of negative resistance region in the V-I characteristic of UJT, also give its applications. [8]

Unit-III

3. (a) Explain Ebers-Moll model of transistor. [8]

- (b) Draw and explain the working of transistor as an amplifier. [8]

OR

3. (a) Write the steps for testing of transistors by digital multimeter.
 - (i) lead identification (base, collector, emitter)
 - (ii) type of transistor (npn or pnp)
 - (iii) it is good or not. [10]
- (b) Write short notes on stabilization techniques for transistor circuit used for different applications. [6]

Unit-IV

4. (a) It is required to operate the JFET shown in fig. 2 at $V_{GS} = -1\text{V}$, $V_{DS} = 4\text{V}$ and $I_{DS} = 1\text{mA}$. Determine:
 - (i) value of R_D and R_S
 - (ii) voltage gain
 - (iii) Input and output resistance

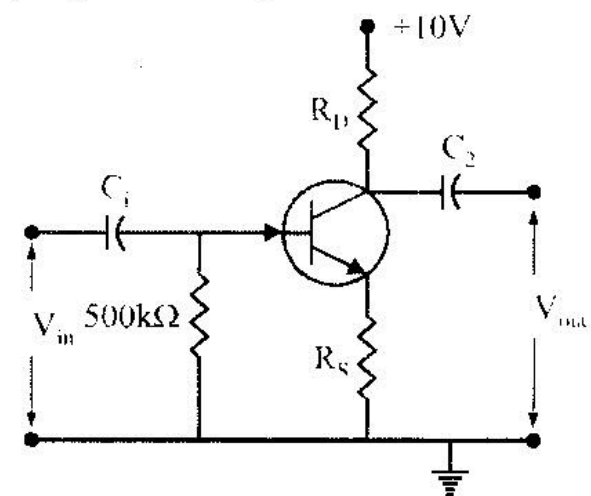


Fig. 2 [8]

- (b) Derive various parameters of JFET soft bias configuration useful in using different applications. [8]

OR

4. (a) Draw and explain the construction and operation of enhancement MOSFET. [8]
- (b) Write various techniques used for handling MOSFET in laboratory. [8]

Unit-V

5. Write short notes on the following : (any two)
 - (a) Role of bootstrapping in darlington pair
 - (b) Emitter follower
 - (c) Cascading transistor amplifiers. [16]