

Roll No. [REDACTED]

Total Pages : 4

8003

BT-I/D09

ELEMENTS OF ELECTRONICS ENGINEERING

Paper : EL-101 (E)

Time : Three Hours]

[Maximum Marks : 75

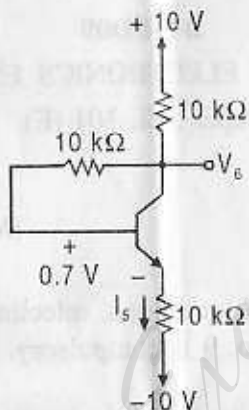
Note : Attempt any *five* questions, selecting *one* question from each unit. Q. No. 9 is compulsory.

UNIT-I

1. (a) The mobilities of free electrons and holes in pure germanium are 0.38 and 0.18 m^2/Vs . The corresponding values for pure silicon are 0.13 and 0.05 m^2/Vs respectively. Determine the value of intrinsic resistivity for both germanium and silicon. Assume that n_i for germanium is $2.5 \times 10^{19} m^{-3}$ and for silicon $1.5 \times 10^{16} m^{-3}$ at room temperature. 7.5
- (b) Show how zener diode can be used in a voltage regulator circuit. Explain voltage regulating capability of the circuit when (i) the load resistance increases; (ii) the input voltage decreases. 7.5
- ✓ 2. (a) Draw the circuits of centre tap full wave rectifier and explain its operation with the help of waveforms. 7.5
- (b) Discuss the construction of LED and its characteristics. 7.5

UNIT-II

3. (a) The transistor in the circuit shown below has $\beta = 50$ and exhibits a V_{BE} of 0.7 V. Find terminal voltage V_6 and I_5 . 7.5



- (b) Compare CB, CE and CC configurations. Which of them is best suited for amplification, and why? 7.5
4. (a) Explain the working of a transistor as an amplifier. Use Common base configuration for the purpose. 7.5
- (b) What is the need of biasing in transistor? Discuss the emitter biased circuit with the help of a neat diagram. 7.5

UNIT-III

5. (a) Draw the circuit of a differential amplifier and explain its transfer characteristics. 7.5
- (b) How do you use an Opamp as an integrator? Draw the circuit and obtain the expression for the output voltage. 7.5
6. (a) What is the difference between a summing amplifier and an adder circuit? Explain with the help of neat diagrams. 7.5

- ✓(b) What do you mean by CMRR of an Opamp ? What are the characteristics of an ideal Opamp ? 7.5

UNIT-IV

7. (a) Give the construction details of a TRIAC and draw its characteristics. List few applications of the TRIAC. 7.5
- (b) Sketch the cross-section of P channel enhancement MOSFET and give their two circuit symbols. Draw their static drain characteristics and transfer characteristics. 7.5
8. ✓(a) Define (i) Pinch-off voltage, and (ii) Channel ohmic resistance in case of FET. 7.5
- (b) Give the construction details of an SCR and draw its characteristics. List few applications of SCR. 7.5

(Compulsory Question)

9. Attempt all the following :

- ✓(a) In case of silicon $p-n$ junction, when barrier potential reaches 0.7 V, the diffusion stops. Why ?
- ✓(b) How can you check the polarity of the diode if the mark on its body is rubbed off or not visible ?
- ✓(c) The rectifier diodes are never operated in breakdown region. Why ?
- ✓(d) Explain why a transistor action cannot be achieved by connecting two diodes back to back.
- (e) Why FET is known as a unipolar device ?

