Roll No. .....

Total No. of Questions : 09] [Total No. of Pages : 02

Paper ID [A0405]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 3rd)

ELECTRONIC DEVICES AND CIRCUITS (EE - 207)

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section - A

Q1) *(10 × 2 = 20)*

a) Explain the term doping and its need.

b) State law of mass action.

c) What do you understand by reverse recovery time? Explain.

d) How does a tunnel diode differ from a normal diode?

e) Define Base spreading resistance of a BJT.

f) What is thermal runway in transistor amplifier circuits?

g) What is the need of stabilizing an operating point?

h) Prove that the –ve feedback in amplifiers increases signal to noise ratio.

i) Define slew rate of an Op-Amp giving value of a typical Op - Amp.

j) Distinguish between voltage feedback and current feedback in amplifier circuits.

Section - B

(4 × 5 = 20)

Q2) A silicon wafer (intrinsic carrier concentration 1×10^{16} m^{-3}) is doped with 2×10^{22} aluminium atoms/m^3 and 1×10^{22} arsenic atom/m^3. Determine the minority carrier concentration. Assume complete dopant ionization.

Q3) Draw the common emitter circuit and explain its characteristics. Indicate the active, saturation and cut-off regions.

Q4) Explain the operation of an N-channel enhancement type MOSFET with the help of its characteristics.

Q5) Describe the general characteristics of negative feedback.

Q6) What is meant by thermal instability in transistors. Enumerate the methods to stabilize it.

Section - C

(2 × 10 = 20)

Q7) Describe the concept of voltage series, voltage shunt, current series and current shunt feedbacks and compare the characteristics of each.

Q8) Explain the working principle of capacitive filters, choke input and L-C filter in detail.

Q9) Write short notes on the following :

(a) Tunnel diode.

(b) Emitter coupled differential amplifier.