Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: B.Tech ECE (III)
Name of the Paper: Electronic Devices and Circuits
Paper Code: TEC 301
Time: 3 hour Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks) CO1

a. Explain the formation of n type and p type semiconductors. Establish a relation between charge densities in both n type and p type semiconductors.
b. Derive an equation for drift current in conductors. What is diffusion current. Write down its equation for n type and p type semiconductors.
c. What is the Hall effect? Derive the expression for the Hall coefficient and discuss its applications in semiconductor device characterization.

Q2. (2X10=20 Marks) CO2

a. Explain the formation of depletion region in PN junction diode. Explain the working of pn junction diode with the help of V-I diagram.
b. Explain the working of clipper and clamper circuit with the help of a diagram.
c. What is Zener breakdown. Explain the use of Zener diode as voltage regulator in a circuit with fixed load and supply voltage.

Q3. (2X10=20 Marks) CO3

a. Explain the working of Common Emitter configuration of BJT with its input and output characteristics.
b. Draw the small signal model of CE configuration of BJT and derive the equation for voltage gain.
c. What is early effect in BJT. Explain the working of BJT as a switch.

Q4. (2X10=20 Marks) CO4

a. What is field effect transistors. Explain the working of JFET in detail with suitable diagram.
b. Draw the small signal model of CS configuration of JFET and derive formula for gain.
c. Draw the small signal model of CD configuration of JFET and derive formula for gain.

Q5. (2X10=20 Marks) CO5

a. Explain the working of enhancement type MOSFET in detail with the help of suitable diagram.
b. Explain the working of depletion type MOSFET in detail with the help of suitable diagram.
c. Derive the relation between V-I characteristics of depletion type MOSFET.

Note For the question paper setters:

- Question paper should cover all the COs of the course.
- Please specify COs against each question.