

B.Tech III Semester Supplementary Examinations, April 2025

Maximum Marks: 60

Date: 09.05.2025

Duration: 3 hours

- Notes:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and the marks are given in the right margin.

Part-A

All the following questions carry equal marks

(10X10=10 Marks)

- 1.a) What happens when a I is in a forward bias to a PN junction diode?
- b) Define the term drift velocity.
- c) Define Law of ohmic current $\sin(\alpha)$.
- d) What is Diffusion and Transition Capacitances.
- e) Define JFET Transconductance Parameter.
- f) Elaborate the Principle of UJT.
- g) What is Peak Factor for FWR.
- h) Write the relationship between α & β .
- i) Differences between MOSFET and JFET?
- j) Why we call FET as a voltage-controlled device?

Marks CO Bloom

1M	1	I
1M	1	I
1M	2	I
1M	2	I
1M	3	I
1M	3	I
1M	4	I
1M	4	I
1M	5	I
1M	5	I

Part-B

Answer All the following questions.

(5X10M=50Marks)

Marks CO Bloom

1. a) What do you understand by depletion region in pn junction?
b) What is the effect of forward and reverse biasing of pn junction on the depletion region? Explain with necessary diagrams.
2. OR
Explain the temperature dependence of V-I characteristics.
a) Explain about breakdown mechanisms in semiconductor diodes.
b) Explain about Zener diode and its characteristics.
3. OR
Find the concentration (number/cm³) of holes and electrons in N-type Silicon at 300 °K, if the conductivity is 300 S/cm. Also find these values for P-type silicon. Given that for Silicon at 300 °K, $n_i = 1.5 \times 10^{10}/\text{cm}^3$, $\mu_n = 1300 \text{ cm}^2/\text{V-s}$ and $\mu_p = 500 \text{ cm}^2/\text{V-s}$.
4. a) Derive the expression for the ripple factor of FWR.
b) Define and derive the terms as referred to FWR circuit. (i) PIV (ii) Average DC voltage.

5M 5M	1	II
10M 5M 5M	1 2	II II
10M	2	UI
4M 6M	3	III

	OR			
7.	Why do we need filters in a power supply, under what condition we shall prefer a capacitor filter and explain its working.	10M	3	III
8.	Define α , β and γ of a transistor. Derive the relation among them and write any two applications of transistor.	10M	4	II
	OR			
9.	An a.c. supply of 230V is applied to a half-wave rectifier circuit through transformer of turns ratio 5:1. Assume the diode is an ideal one. The load resistance is 300Ω . Find (a) dc output voltage (b) PIV (c) maximum value of load current (d) average value of load current and (e) power delivered to the load.	10M	4	III
10.	Explain the construction and working of Enhancement MOSFET.	10M	5	II
	OR			
11.	Explain the construction and working of JFET.	10M	5	II