R22 Regulation *Subject code:4E3EA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, June 2026

SEMICONDUCTOR DEVICES AND CIRCUITS

(Common to CSE, CSE(AI&ML) & CSE(DS))

Maximum Marks: 60 Date:11.06.2026 Duration: 3 hours

Note: **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 may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	What is meant by Intrinsic semiconductor?	1	1	2
b)	Define dynamic resistance	1	1	2
c)	What is Avalanche break down?	1	2	1
d)	List the applications of Zener diode applications	1	2	2
e)	What is Rectifier?	1	3	2
f)	Define transformer utilization factor.	1	3	2
g)	What is operating point?	1	4	2
h)	Draw the CB transistor diagram	1	4	2
i)	Define Pinch of voltage	1	5	3
j)	Expand MOSFET	1	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Explain the V-I Characteristics of PN junction diode in Forward & Reverse bias and derive the current equation.	10	1	2
	OR			
3	a) Explain the drift current and diffusion current. b) Explain and derive the equations for transition capacitance and diffusion capacitance.	3M 7M	1	3
4	With V-I characteristics describe the working principle of SCR.	10	2	3
	OR			
5	Draw the equivalent circuit of UJT and explain its operation with the help of emitter characteristics.	10	2	3
6	Explain the operation of bridge rectifier with neat diagrams and waveforms.	10	3	2

	OR			
7	Draw the full wave rectifier circuit diagram and derive the expression for ripple factor and efficiency.	10	3	2
8	Discuss about different types of biasing techniques in BJT.	10	4	3
	OR			
9	Draw the Common collector BJT diagram and explain its operation.	10	4	3
10	Construct the JFET and explain its drain and transfer characteristics.	10	5	3
	OR			
11	Compare BJT, FET and MOSFET.	10	5	3