R20 Regulation *Subject code:3E2AH*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech II Semester Supplementary Examinations, June 2026

SEMICONDUCTOR DEVICES AND CIRCUITS

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

Maximum Marks: 70 Date: 19.06.2026 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 (10X2M=20 Marks)		Marks	CO	BTL
1	Write the properties of a semiconductor.	2M	1	L1
2	Differentiate between ideal and practical diode.	2M	1	L1
3	Define Zener breakdown.	2M	2	L1
4	Draw V-I characteristics of SCR.	2M	2	L1
5	Define PIV, Peak factor and Ripple factor of a rectifier.	2M	3	L1
6	List the advantages of Bridge rectifier.	2M	3	L1
7	Define Thermal runaway.	2M	4	L1
8	Draw PNP & NPN transistor symbols.	2M	4	L1
9	Draw the structure of P Channel depletion MOSFET.	2M	5	L1
10	Compare depletion and enhancement MOSFET.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Derive the Diode current equation of a PN junction diode.	10M	1	L2
	OR			
12	Explain how depletion layer is formed in P-N junction Diode with neat diagrams and list applications of diode.	10M	1	L2
13	Explain the operation of a Tunnel Diode using Energy band diagrams.	10M	2	L2
	OR			
14	Explain the V-I characteristics of Zener diode with neat sketches and list the applications.	10M	2	L2
15	Explain the operation of a Full wave Rectifier. Derive its ripple factor, Efficiency, PIV, and Form Factor.	10M	3	L2
	OR			
16	Why filter is needed in rectifier? Draw and explain operation of the	10M	3	L2

	Capacitor filter for Full wave rectifier.			
17	Explain the input and output characteristics of CB configured transistor circuit with a neat circuit diagram.	10M	4	L2
	OR			
18	Explain the input and output characteristics of CE configured transistor circuit with a neat circuit diagram.	10M	4	L2
19	Explain Drain & transfer characteristics of JFET and give the advantages of JFET.	10M	5	L2
	OR			
20	Explain the construction and operation of a Enhancement MOSFET and draw its characteristics.	10M	5	L2