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 2024

SEMICONDUCTOR DEVICES AND CIRCUITS

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

Maximum Marks: 70 Date28.06.2024 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 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)		Blooms Tx	CO
1	What is doping.	L1	C1
2	Define static and dynamic forward resistances.	L1	C1
3	Define Zener breakdown.	L1	C2
4	Draw V-I characteristics of SCR.	L1	C2
5	Define PIV, Peak factor and Ripple factor of a rectifier.	L1	C3
6	Draw the circuit of Bridge rectifier with capacitor filter.	L2	C3
7	Write the relation between α β and Υ..	L6	C4
8	Define stability factor.	L6	C4
9	List the advantages of FET over BJT.	L1	C5
10	Draw the symbols of P-Channel JFET and P- Channel enhancement MOSFET	L1	C5
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11.a	Explain how depletion layer is formed in P-N junction Diode with neat diagrams. (7M)	L2	C1
11.b	Determine the value of forward current for a pn junction with Io = 15 μA, V_f = 0,6V , at T=300K.Assume silicon diode. (3M)	L3	C1
	OR		
12.a	Derive current equation of a diode. (6M)	L6	C1
12.b	Derive the expression for Dynamic resistance. (4M)	L6	C1
13.	Explain the operation of a Tunnel Diode using Energy band diagrams. (10M)	L2	C2
	OR		
14	Explain the V-I Characteristics of Zener diode with neat sketches. (10M)	L2	C2

15.a	Draw the circuit and explain the operation of a Bridge Rectifier. (7M)	L2	C3
15.b	A sinusoidal voltage whose Vm=20V is applied to Full wave bridge Rectifier. The diode may be considered to be ideal and R_L-=1KΩ is connected as load. Find out the peak current, DC current, RMS current and ripple factor. (3M)	L3	C3
	OR		
16.	Draw and explain the operation of full wave rectifier with L-section filter. (10M)	L2	C3
17.	Explain the input and output characteristics of CE configured transistor circuit with a neat circuit diagram. (10M)	L2	C4
	OR		
18.a	Explain operating point of a transistor and explain the concept of D.C Load line. (7M)	L2	C4
18.b	Determine the operating point for a fixed bias circuit whose V_{cc}=10V, R_c=2KΩ, R_b=930KΩ, β=50 for a silicon transistor. (3M)	L3	C4
19.	With the help of neat circuit diagram explain the operation of N-channel JFET. (10M)	L4	C5
	OR		
20.	Explain the construction and operation of a Depletion MOSFET and draw its characteristics. (10M)	L2	C5