



Regulation R20

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code: 3E2AH

B.Tech II Semester Supplementary Examinations, January 2024

SEMICONDUCTOR DEVICES AND CIRCUITS

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

Maximum Marks: 70

Date: 25.01.2024 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	Write the properties of a semiconductor.	L1	C1
2	Differentiate between ideal and practical diode.	L2	C1
3	Define Zener breakdown.	L1	C2
4	Draw the V-I characteristics of Tunnel diode.	L1	C2
5	Define Rectifier and Filter and mention types of Filters.	L1	C3
6	Explain about bleeder resistor.	L2	C3
7	Explain Thermal runaway.	L2	C4
8	Draw PNP & NPN transistor symbols.	L1	C4
9	Draw the structure of P Channel depletion MOSFET.	L1	C5
10	Compare depletion and enhancement MOSFET.	L2	C5
Part-B			
Answer All the following questions. (5X10M=50Marks)			
11.a	Explain the formation of N-type and P-type semiconductor. (7M)	L2	C1
b	A silicon diode has reverse saturation current of 2.5microamps at 300K. Find forward voltage for a forward current of 10mAmps. (3M)	L3	C1
OR			
12.a	Explain the current components in a PN junction diode. (5M)	L2	C1
b	Explain the dependency of temperature on PN junction diode. (5M)	L2	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.	Explain the operation of a Full wave Rectifier. Derive its ripple factor, Efficiency, PIV, and Form Factor. (10M)	L2	C3
OR			

16.a	Draw and explain operation of the Capacitor filter for Half wave rectifier. (6M)	L2	C3
b.	A 100microfarad capacitor when used as filter has 15v a.c across it with a terminating load resistor of 2.5kohm. If the filter is a half wave and supply frequency is 50Hz, what is the percentage ripple in the output. (4M)	L3	C3
17.	Explain the input and output characteristics of CE configured transistor circuit with a neat circuit diagram. (10M)	L2	C4
OR			
18.a	Define α β and γ . Write relation between α β and γ . (4M)	L1	C4
b.	Explain the Voltage divider biasing technique of a Transistor and derive its stability factor. (6M)	L2	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