*Regulation R18* *Subject code:2E2AG*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech II Semester Supplementary Examinations, January 2024

## ELECTRONIC DEVICES & CIRCUITS

*(Common to EEE & IT)*

***Maximum Marks: 70*** Date: 29.01.2024 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) | | CO | Bloom Tx |
|---|---|---|---|
| 1 | Define diode resistance. | CO-1 | L-1 |
| 2 | Draw equivalent circuit of ideal diode. | CO-1 | L-1 |
| 3 | Define breakdown mechanisms in a diode. | CO-2 | L-1 |
| 4 | Draw the V-I characteristics of Varactor diode. | CO-2 | L-1 |
| 5 | Define Filter and mention types of Filters. | CO-3 | L-1 |
| 6 | Define the Rectifier. | CO-3 | L-2 |
| 7 | Define an Amplifier.. | CO-4 | L-1 |
| 8 | Define stabilization factor of transistor. | CO-4 | L-1 |
| 9 | List the advantages of FET over BJT. | CO-5 | L-1 |
| 10 | Draw the symbols of P-Channel JFET and P- Channel enhancement MOSFET | CO-5 | L-1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | | | |
|---|---|---|---|---|
| 11.a | Explain the operation of P-N Junction Diode with its V-I characteristics. | 6M | CO-1 | L-2 |
| 11.b. | Explain the junction capacitance of PN junction diode . | 4M | CO-1 | L-2 |
| | OR | | | |
| 12.a. | Derive the Dynamic resistance of PN Junction diode. | 6M | CO-1 | L-4 |
| 12.b. | The voltage of silicon diode at room temperature at 300K is 0.71V when 2.5mA current flows through it .if the voltage increases to 0.8V calculate the new diode current. | 4M | CO-1 | L-3 |
| 13. | Explain the operation of a Tunnel Diode using Energy band diagrams. | 10M | CO-2 | L-2 |
| | OR | | | |

| | | | | |
|---|---|---|---|---|
| 14. | Explain the operation of Zener diode and draw its characteristics. | 10M | CO-2 | L-2 |
| 15.a. | Explain the operation of a Half wave Rectifier. Derive its ripple factor, Efficiency, PIV, and Form Factor. | 6M | CO-3 | L-2 |
| 15.b. | A sinusoidal voltage of amplitude 25 volts and frequency 50 hz is applied to a HWR using PN diode. No filter is used and the load resistor is 1000 ohms. The forward resistance Rf of ideal diode is 10ohm. Calculate i) peak , average and rms values of load current ii) d.c power output iii)a.c power input, iv) rectifier efficiency v) ripple factor. | 4M | CO-3 | L-3 |
| | OR | | | |
| 16.a. | Explain C -section filter with neat circuit diagram. | 6M | CO-3 | L-2 |
| 16.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 full wave and supply frequency is 50Hz, what is the percentage ripple in the output? | 4M | CO-3 | L-3 |
| 17. | Explain the input and output characteristics of CC configured transistor circuit with a neat circuit diagram. | 10M | CO-4 | L-2 |
| | OR | | | |
| 18.a. | Explain operating point of a transistor and explain the concept of D.C Load line. | 6M | CO-4 | L-2 |
| 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. | 4M | CO-4 | L-3 |
| 19. | Explain the operation of JFET with the help of neat circuit diagram. | 10M | CO-5 | L-2 |
| | OR | | | |
| 20. | Explain the construction and operation of a Enhancement MOSFET and draw its characteristics. | 10M | CO-5 | L-2 |