B.E. / B.Tech. (Electronics & Communication / Telecommunication Engineering)
Model Curriculum Semester-III

SE102 / 002 - Electronics Devices

P. Pages : 2 **GUG/W/24/13907**

Time : Three Hours * 5 5 1 9 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Write a note on classification of materials using energy band diagrams. **8**

b) Explain the charge density in semiconductor material. **8**

OR

2. a) What is Doping in semiconductors? With neat sketches and examples explain the Intrinsic and Extrinsic Semiconductors. **8**

b) What is Fermi Dirac Distribution function? Also explain effect of temperature on Fermi Dirac Distribution function. **8**

3. a) Explain Zener Diode and its applications. **8**

b) Explain the construction of P-N junction diode. Also draw the symbol of P-N junction diode. **8**

OR

4. a) Explain in relation with diodes the Avalanche breakdown and Zener breakdown. **8**

b) Explain in detail about the two types of Capacitances that occur in P-N junction diode. **8**

5. a) With neat waveforms and circuit diagram explain the operation of Half Wave Rectifier with shunt capacitor filter. **8**

b) A bridge rectifier is applied with input from a step down transformer having turns ratio 8:1 and input 230V, 50Hz. If $R_F = 1\Omega, R_S = 10\Omega, R_L = 2k\Omega$. Find- **8**

i) DC Power output
ii) PIV across each diode
iii) Percentage efficiency
iv) Percentage regulation at full load

OR

6. a) A full wave rectifier uses a center tap transformer whose turns ratio to half secondary is 10:1 and is supplied with 230V at 50Hz. The load resistance is 50Ω. Calculate the load voltage and ripple voltage. **8**
If now a capacitor of $470\mu F$ is used as filter, recalculate the load voltage and the ripple voltage, assuming same load current.

b) For a bridge rectifier circuit derive the equations for- **8**

i) Average / DC load current (I_{LDC})

ii) Average / DC load voltage (V_{LDC})

iii) RMS load current (I_{RMS})

iv) DC Power output (P_{DC})

7. a) Draw and explain input and output V-I characteristics of Common Base configuration of transistor. **8**

b) Write a note on Ebers-Moll model of bipolar junction transistor. **8**

OR

8. a) Explain the types of MOSFET with neat sketches showing their constructions. **8**

b) Compare JFET with MOSFET. **8**

9. a) Explain in detail the Voltage Divider Transistor Biasing. **8**

b) What is DC load line? Derive its equation for CE Amplifier. Also explain Q point on DC load line. **8**

OR

10. a) Write a note on the Collector to Base Biasing for Transistor. **8**

b) Define β_{dc}. Also derive the relationship between α_{dc} and β_{ac}. **8**

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