ELECTRONICS ENGINEERING

ASSIGNMENT-01

Note : Write answers for any FIVE questions

Q1. Why Silicon diode is preferred over Germanium Diode.

Q2. Define transformer utilization factor.

Q3. For a regulator circuit Resistance R is connected in between a d.c. power supply v=200V and a Zener diode is connected with V_z =50 Volt. Resistor R_L is connected across the Zener diode.
(i) Show the circuit arrangement.
(ii)Calculate 'R' to allow voltage regulation from no I_L=0 to I_L max. What is $I_{Lmax.?}$
(iii) If 'R' is set as in part (ii) and the current through load set at I_L =25mA. What are the limits between which V may vary without loss of regulation in the circuit?

Q4. Comment on critical inductance and describe physical mechanism of avalanche multiplication.

Q5. Consider a full wave bridge rectifier. Calculate the ripple factor for it.

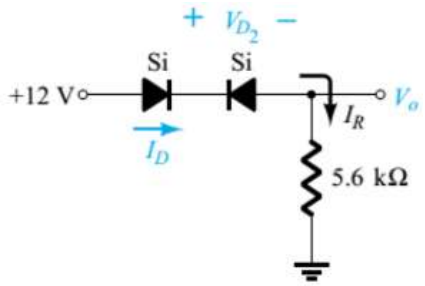
Q6. Draw the circuit diagram of a full wave rectifier.

Q7. Draw the V-I characteristics of a Zener diode

Q8. Differentiate between LED and Conventional diode

Q9. Prove that built in potential at a Si PN Junction is depends on donor and acceptor ion concentrations.

Q10. Determine I_D, V_{D2}, and V_O in the figure given



Que 11. What is an ideal diode. Draw the V-I characteristics of the ideal diode. Draw equivalent model and VI characteristics for diode with practical consideration of diode resistances and diode capacitances.

Que 12. Define the cut-in voltage and explain the effect of temperature on the volt ampere characteristics of a diode.

Que 13. Explain the following terms:

- Bulk resistance.
- Junction resistance.
- AC or Dynamic resistance.

Que 14. Define the term transition capacitance of a reverse bias diode and proof that

$$C_T = €A/W.$$

Que 15. A sample of Ge is doped to the extent of 10^{14} doner atom/cm^3 and $7x10^{12}$ acceptor atoms/cm^3 . At the temperature of the sample the resistivity of pure Ge is 60Ω-cm. If the applied Electric field is 2 v/cm. Find the total conduction current density.

Que 16. Define a graded semiconductor, Explain why an electric field must exist in a graded semiconductor and prove that an open circuited step graded PN junction :

$$Vo = V_T \, l_n \, N_A N_D / n_i^2$$

Que 17. With neat sketch explain the working of Full wave rectifier. Derive an Expression for the Efficiency of the Full wave Rectifier.

Que 18. Explain the avalanche multiplication and the zener breakdown mechanism for breakdown diodes.

Que 19. What is zener diode ? Draw the V-I characteristics of zener diode and with help of circuit diagram, Explain the working of zener diode as voltage regulator.

Que 20. Write the short notes on :

1. Ripple factor.
2. Transformer utilization factor.
3. Voltage regulation.
4. Peak inverse voltage.

Que 21. Explain LC filter.

Que 22. A fullwave rectifier circuit is fed from a transformer having the center tapped secondary binding the rms voltage from either and of the secondary to center tap is 30 volt. If diode forward resistance is 2Ω. And that of the half secondary is 8Ω for a load of 1 k Ω, calculate

1) Power deliver to the load .
2) % regulation at full load.
3) Next efficiency of rectification.
4) T.U.F. of secondary.

Que 23. (i) The avalanche diode regulator at 50volt over a range of diode current from 50-40mA The supply voltage V = 200V. calculate R to allow the voltage regulation from a load current $I_{L=}$ 0 up to $I_{max,}$ the maximum possible value of I_L , What is I_{max} ?

(ii) If R is set as in the part (i) and the load current is set at 25mA, What are the limits between which V may vary without loss of the regulation in circuit.