

TEC-101

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Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No.

Odd Semester Examination-2016

B.Tech. (Semester-I)

**FUNDAMENTAL OF ELECTRONIC
ENGINEERING**

[Time : 3 Hours]

[Maximum Marks :100]

Note : Attempt **all** questions.

1. Attempt **any four** questions : [5×4=20]

(a) Draw and explain V-I characteristics of p-n junction.
Explain how Depletion layer develops in the diode.

(b) Define the following terms:

(i) Knee voltage

(ii) Peak inverse voltage

(iii) Leakage current

(c) Describe how p-type and n-type semiconductors are produced. State the main difference between them.

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(1)

[P.T.O.]

- (d) Explain Diffusion capacitance and transition capacitance.
- (e) Explain Drift and Diffusion current.
- (f) At room temperature the reverse saturation current is $0.3\mu\text{A}$ when a reverse bias is applied to a germanium diode. Find the value of current flowing in a diode when 0.15V forward bias is applied.

2. Attempt any four questions : [5×4=20]

- (a) The mobilities of free electrons and holes in a pure germanium are 0.38 and $0.18\text{ m}^2/\text{V}\cdot\text{s}$. Find the value of intrinsic conductivity. Assume $n_i = 2.5 \times 10^{19}/\text{m}^3$ at room temperature.
- (b) Draw the circuit diagram of full wave rectifier using two diodes and explain its working showing input and output waveforms. Derive I_{dc} , I_{rms} and PIV for the same.
- (c) Differentiate between Zener and Avalanche breakdown mechanisms.
- (d) Explain various Clipper circuits.
- (e) Explain Voltage Multiplier with the help of circuit diagram.

- (f) A half - wave rectifier is used to supply 12V dc to a resistive load $R_L = 500 \Omega$. If the forward resistance of the diode is 25Ω , find the rms value of ac voltage supplied to the circuit.

3. Attempt **any two** questions : [10×2=20]

- (a) Draw and explain the i/p & o/p characteristics of BJT in CE configuration, indicating the operating regions. Also explain why CE configuration is most widely used in amplifier circuits.
- (b) Explain the need of biasing. Discuss the potential divider biasing technique and derive its stability factor.
- (c) In a CE configuration the collector supply voltage $V_{cc} = 10V$. When a resistor $R_c = 1K \Omega$ is connected in the collector circuit the voltage drop across it is 0.5 V. If $\alpha = 0.98$ determine Collector Emitter voltage and Base current.

4. Attempt **any two** questions : [10×2=20]

- (a) Explain the construction and working of the DE-MOSFET. Also explain the drain and transfer characteristics of DE- MOSFET.

(b) Explain self biasing for n channel JFET. Also find the operating point Q.

(c) A certain JFET has $I_{DSS}=12\text{mA}$ and $V_p = -6\text{V}$. Draw the transfer curve.

5. Attempt any two questions : [10×2=20]

(a) Minimize the following using K Map
 $f(a, b, c, d) = \sum m (0, 1, 3, 4, 7, 9, 10, 14, 15)$

(b) Design AND, OR, NOR GATE USING NAND gate.

(c) (i) Derive the close loop voltage gain expression (A_v) of Inverting and Non Inverting Amplifier.

(ii) Draw the circuit diagram and explain Unity gain amplifier using op-amp.

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