

[Time: 3 Hours]

[Marks:80]

Please check whether you have got the right question paper.

N.B:

1. **Question -1 is compulsory,**
2. **Solve any THREE from remaining questions.**
3. Assume suitable if it is required.

- 1
 - a) How Zener diode is different than normal diode? (5)
 - b) Explain nonlinear effects in MOSFET? (5)
 - c) Draw and explain Ebers. moll model of BJT (5)
 - d) Compare BJT and IGBT (5)

- 2
 - a) Draw the graph of built in potential V_{bi} for a symmetrical si diode ($N_a = N_d$) at $T = 300^\circ\text{k}$. over the range $10^{14} \leq N_a \leq 10^{19} \text{ cm}^{-3}$. (10)
 - b) Explain working of BJT considering all possible modes of operation. (10)

- 3
 - a) Derive the equation of threshold Voltage V_{Th} of n channel Enhancement MOSFET (10)
 - b) Neatly sketch all FET characteristics. Explain how various parameters can be determined from the characteristics. State drain current equation of FET. (10)

- 4
 - a) Sketch and explain Tunnel diode characteristics. Explain applications of this diode (10)
 - b) Explain construction, working and characteristics of D – MOSFET. (10)

- 5
 - a) Explain how optical device are classified? Explain any one photodetector in detail. (10)
 - b) Draw and explain construction and characteristics of UJT. State its applications. (10)

- 6 Write notes on any TWO of the following. (20)
 - a) HBT
 - b) Solar Cell.
 - c) SCR
 - d) Diac and Triac