

QP Code : 30554

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory and Solve any three questions from remaining questions
(2) Assume suitable data wherever applicable.
(3) Draw neat and clean diagrams.

1. Answer any four. 20
- (a) Justify that the space charge width increase with reverse biased voltage in a p-n junction diode.
 - (b) Explain zener diode application as voltage regulator.
 - (c) Define internal pinchoff voltage, pinchoff voltage and drain to source saturation voltage.
 - (d) Describe construction and V-I characteristics of JGBT.
 - (e) Explain two terminal MOS structure.
2. (a) Explain concept, working and characteristics of Tunnel diode. 10
(b) Explain the types of junction breakdown in case of zener diode. 10
3. (a) For a n-channel JFET with $I_{DSS} = 8 \text{ mA}$, $V_p = -4 \text{ V}$ 10
- (i) If $I_D = 3 \text{ mA}$ calculate the value of V_{GS}
 - (ii) Calculate $V_{DS(SAT)}$ for $I_D = 3 \text{ mA}$
 - (iii) Calculate transconductance (g_m)
- (b) Explain minority carrier distribution in BJT considering transistor in active, cut off and saturation mode. 10
4. (a) Compare Enhancement type and Depletion type MOSFET on the basis of their construction, working principle, characteristics and biasing. 10
(b) Discuss construction and working of SCR with its characteristics in detail. 10
5. (a) Discuss Ebers-Moll model for BJT in detail. 10
(b) Discuss HBT in detail. 10
6. Write short notes 20
- (a) Optocoupler
 - (b) Gunn diode
 - (c) MESFET
 - (d) DIAC-TRIAC