

Q.P. Code : 547301

(3 Hours)

[Total Marks : 80

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

1. Solve any four

- (a) For diodes, define forward voltage drop, maximum forward current, dynamic resistance, reverse saturation current and reverse breakdown voltage. 5
- (b) For diodes, discuss different types of junction breakdown in detail. 5
- (c) Write short note on HBT. 5
- (d) Sketch the characteristics of PN junction solar cell and explain. 5
- (e) Explain the two terminal MOS structure. 5
2. (a) Explain the construction and working of Gunn diode with V-I characteristics. 10
- (b) Compare Enhancement type and Depletion type MOSFET on the basis of their construction, working principle, characteristics and biasing. 10
3. (a) Explain characteristics of Zener diode. Explain Zener diode as voltage regulator. 10
- (b) With neat diagram explain minority carrier distribution in an npn transistor operating in forward active mode. 10
4. (a) Explain the non ideal effects in case of BJT. Explain base width modulation in detail. 10
- (b) Discuss Ebers-Moll model for BJT in detail. 10
5. (a) Explain the operation of photodiode and avalanche photodiode. 5
- (b) Draw and explain VI characteristics of DIAC. 5
- (c) Discuss construction and working of SCR with its characteristics in detail. 10
6. (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 VGS
- (ii) Calculate $V_{DS(SAT)}$ for $I_D = 3\text{mA}$.
- (iii) Calculate transconductance (g_m)
- (b) Discuss the structure and working of MESFET. Draw V-I characteristics and explain. 10