(3 Hours) **Marks: 80**

N.B: (1) Question No.1 is compulsory and solves any three questions from remaining questions.
(2) Assume suitable data if necessary.
(3) Draw neat and clean figures.

1. Answer any four:

(a)	What are non-ideal effects in BJT? Explain any one non ideal effect in BJT.	05
(b)	With neat diagram explain the operation of UJT relaxation oscillator.	05
(c)	Compare photodiode with phototransistor.	05
(d)	Explain two terminal MOS structure.	05
(e)	Explain zener diode application as voltage regulator.	05
2. (a)	Explain concept, working and characteristics of Tunnel diode.	10
(b)	Explain working of BJT considering all possible current density components in an NPN transistor operating in Active mode.	10
3. (a)	For a n channel JFET with IDSS= 8mA, V_p = - 4v (i) If I_D= 3mA calculate the value of V_{GS} (ii) Calculate $V_{DC\,(SAT)}$ for I_D= 3mA. (iii) Calculate transconductance (gm)	10
(b)	What is primary advantage of HBT over BJT? Draw and explain schematic cross section of an npn HBT structure with its energy band diagram when HBT is operated under active mode?	10
4. (a)	Describe construction, working and characteristics of: i. SCR ii. IGBT	10
(b)	Discuss Ebers- Moll model for BJT in detail	10
5. (a)	Explain JFET with the help of construction and V-I characteristics, how it is different than BJT.	10
(b)	Explain construction, working and characteristics of TRIAC	10
6.	Write short notes (a) Optocoupler (b) Gunn diode (c) MESFET (d) Solar cell	20

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