

Code No: 53009

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November - 2015

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, ECE, CSE, EIE, IT, MCT, ETM)

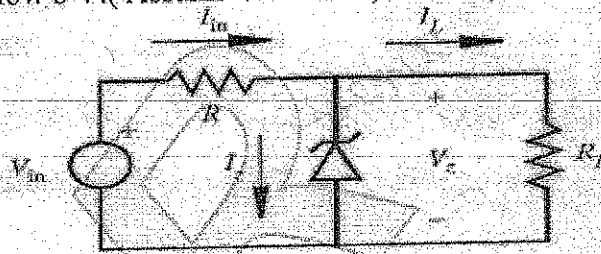
Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

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- 1.a) Explain the differences between Avalanche breakdown and Zener breakdown.
- b) Find static and dynamic resistance of pn junction silicon diode if temperature is 27°C and saturation current is $1\mu\text{A}$ for an applied forward voltage of 0.2V . [9+6]
- 2.a) Define Voltage Regulation and explain how it is obtained using Zener Diode.
- b) The 6V Zener diode shown in the figure has zero zener resistance and a knee current of 5mA . What is the minimum value of R_L so that the voltage across it does not fall below 6V . (Assume $V_{in}=10\text{V}$, $R=50\Omega$). [8+7]



- 3.a) Explain the operation of a transistor.
- b) Explain about Early effect.
- c) Derive the relation between α and β of a transistor. [5+5+5]
4. What is the necessity of bias compensation of a transistor? With necessary circuit diagrams, explain various types of compensation circuits. [15]
- 5.a) Draw BJT Hybrid Model circuits for the three configurations of a transistor.
- b) The hybrid parameters for a transistor used in CE configuration are $h_{ie}=2000\Omega$; $h_{fe}=300$; $h_{re}=1.5 \times 10^{-4}$; $h_{oe}=25 \times 10^{-6}\Omega$. The transistor has a load resistance of $40\text{K}\Omega$ in the collector and is supplied from a signal source of resistance $5\text{K}\Omega$. Compute the value of input impedance, output impedance. [9+6]
- 6.a) Draw the JFET Small Signal Model and obtain the relation between amplification factor, transconductance and drain resistance.
- b) For an n-channel JFET, $I_{DSS}=8.7\text{mA}$, $V_P=-3\text{V}$, $V_{GS}=-1\text{V}$. Find the values of:
i) I_D ii) g_m . [9+6]
- 7.a) Elucidate how FET acts as a Voltage Variable Resistor.
- b) Explain the working of Common Drain Amplifier of a FET. [7+8]
- 8.a) Differentiate between pn diode and Schottky Barrier Diode and explain the Principle of Operation of Schottky Barrier Diode.
- b) Explicate the working principle of a Varactor Diode. [8+7]

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