

Code: 9A04301

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II B.Tech I Semester (R09) Regular & Supplementary Examinations, November 2011

ELECTRONIC DEVICES AND CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC, CSS, IT, CSE, EEE & MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Discuss about working of a zener diode using its V-I characteristics.
(b) The current flowing in a silicon PN junction diode at room temperature is $10\mu\text{A}$, when the large reverse voltage is applied. Calculate the current flowing when 0.2v forward bias is applied.
- 2 (a) With a neat circuit diagram explain the working principle of a Zener voltage regulator.
(b) For a Zener shunt regulator if $v_z=10\text{v}$, $R_S=1\text{k}\Omega$, $R_L=10\text{k}\Omega$ and the input voltage varies from 25 to 40 V. Find the maximum and minimum values of Zener current.
- 3 (a) Define α and β . Derive the relationship between α and β of the transistor.
(b) For a PNP transistor $\alpha=0.98$ connected in CB configuration and reverse saturation current is $10\mu\text{A}$. Calculate the base and collector currents for an emitter current of 5mA .
- 4 (a) Bring out the differences between Emitter feedback bias and collector to emitter feedback bias.
(b) In a self bias circuit $V_{CC}=10\text{v}$, $R_C=2.5\text{k}\Omega$ and the Q point is $V_{CE}=5\text{v}$ and $I_C=2\text{mA}$. A stability factor of 10 is desired and $\beta=60$. Calculate R_1 , R_2 and R_E .
- 5 (a) Give the analysis of a JFET small signal model. Derive the necessary equations.
(b) Determine drain to source resistance γ_{ds} of an n-channel depletion type MOSFET having $I_{DSS}=10\text{mA}$ and $V_P=-2\text{v}$ for V_{GS} values of (i) 3v and (ii) 4.5v .
- 6 (a) With a neat circuit diagram explain about fixed bias arrangement of a JFET.
(b) Calculate the dynamic resistance of a JFET having an amplification factor of 80 and transconductance of $400\mu\text{mho}$.
- 7 (a) For a common emitter amplifier derive the expressions for A_i , A_v , R_i and R_o .
(b) For the emitter follower with $R_S=0.75\text{ k}\Omega$ and $R_L=3\text{ k}\Omega$. Calculate A_i , R_i , A_v , A_{vS} and R_o . Assume $h_{fe}=50$, $h_{ie}=1\text{ k}\Omega$, $h_{oe}=25\mu\text{A/v}$.
- 8 Write short notes on the following
 - (a) Tunnel diode.
 - (b) Silicon controlled rectifier.
