

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), May 2019

B. Tech in ECE Engineering, Semester III

Roll No.....

COURSE CODE: COURSE TITLE:ECE 301

Time: 3 hours

Max. Marks: 40

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

- Q.1 Draw the current components in forward biased diode. 10
A pn Junction diode has saturation current of 10^{-14} A at 27°C . The diode is biased at voltage of 0.7 V. Determine the saturation current and the total diode current (under forward bias) at 350 K. The Boltzman constant $k=1.38\times 10^{-23}$ $\text{m}^2\text{kg. s}^{-1}\text{.K}^{-1}$ or $V_T=26$ meV.
- Q.2 Draw the circuit for Potential Divider Biasing for BJT. Consider the potential divider resistors as $70\text{ K}\Omega$, $44.8\text{ K}\Omega$ and Collector and Emitter bias resistors as $4\text{ K}\Omega$ each. Comment on the biasing network. 10
- Q.3 Write the equation for Drain Current I_D in cutoff, non-saturation and saturation regions of MOSFET. Consider Four Resistor Bias Circuit for MOSFETs, $V_{DD}=10\text{ V}$, $R_1=17\text{ K}\Omega$, $R_2=34\text{ K}\Omega$, $R_D=R_S=10\text{ K}\Omega$, $V_{TN}=1\text{ V}$, $k_N'=40\mu\text{A/V}^2$, $W=10\mu\text{m}$, $L=1\mu\text{m}$. Determine the Quiescent Drain current. 10
- Q.4 Derive the expression for current ratios in Differential amplifier and draw the current transfer characteristics of npn Differential amplifier. 10
Consider an DA with $V_{CC}=-V_{EE}=5\text{ V}$, and a resistor R_E of $4.3\text{ k}\Omega$ attached between common emitter and V_{EE} . Assume that base of both the transistors are connected to ground. Determine the dc bias currents of the transistors.