The transistor in the amplifier shown below has \( \beta = 100, \ V_A = 200 \ V, \ r_X (r_b) = 0, \ C_n = 300 \ pF, \) and \( C_\mu = 4 \ pF. \) Assume \( V_{BE} = 0.7 \ V \) in the active region and \( V_{CE} = 0.3 \ V \) in saturation.

![Amplifier Circuit Diagram]

**Problem 4 - Analog and Digital Electronics**

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a) For this amplifier, determine values for \( R_B \) and \( R_E \) so the dc bias point is at \( I_{CQ} = 10 \ mA \) and \( V_{EQ} = 10 \ V. \) (0.5 points)

b) Determine the input resistance \( R_{in}, \) the output resistance \( R_{out}, \) the midband amplifier voltage gain \( A_V = v_o / v_i, \) and the midband signal source voltage gain \( G_V = v_o / v_s. \) (2 points)

c) As is typical, the frequency response of this amplifier has a bandpass characteristic.

i) Determine a good approximate value for the lower -3 dB frequency, \( f_L. \) (0.5 points)

ii) Determine a good approximate value for the upper -3 dB frequency, \( f_H. \) (1 point)