Department of Electrical Engineering
Indian Institute of Technology, Kanpur

EE 210 **QUIZ 1B** **10.2.21**
Total Marks: 15 **Total Time: 30 Mins.**

An npn BJT has f_{max} of 10 GHz, and the ratio of its f_α and f_T is 1.005. (V_T = 26 mV)

a) It needs to be biased such that the following performance requirements are satisfied:
   * r_0 should be 50 kΩ
   * β should be 5 at f = 600 MHz

   Determine the required bias point (I_C, V_{CE}). Assume that the BC junction is *linearly graded* with $V_{0(BC)}$ = 0.7 V. Other data: V_A = 100 V, C_{je0} = 1 pF, and $C_{\mu 0}$ = 1.7 pF. **12**

b) Now, if V_{CE} is *decreased, state with clear justification* whether the value of β (at 600 MHz) would increase or decrease. Neglect any change in I_C and assume τ_F remains constant. **3**