Quiz-1 (2023)

Course: PH209

Time: 50 min

1. a) Draw the energy band diagram of a PNP transistor (including Fermi level) when it is in an active region and give the justification of your drawing. [Mark 2]

   b) Explain how the emitter resistance of a CE amplifier can stabilize a quiescent operating point. [Marks 2]

2. For the silicon transistor given in the figure below, the minimum value of $\beta = 30$

(a) For $V_i$=12 V find the state of the transistor (in which region it is operating), and find $V_o$

(b) Suppose the 15k resistance is replaced with another resistance $R_1$, find the minimum value of $R_1$ for which the transistor is in the active region. [Marks 6]