1) In the circuit below the transistor Beta is 180. Determine the following:

a) The values of the components in a Thevenin equivalent of the base bias circuit.
   \[ R_{th} = \frac{30k}{12k} = 8.57k \quad V_{th} = 12V \times \frac{12k}{42k} = 3.429V \]

b) Base current.
   \[ I_B = \frac{(3.429 - 0.7)}{(8.57k + 181 \times 1.2k)} = 0.0129mA \]

c) Voltage drop across \( R_e \).
   \[ V_{Re} = (1 + \beta)I_B R_e = 181 \times 0.0129mA \times 1.2k = 2.625V \]
2) Use the transistor characteristics and load line in the figure below to determine the following:

a) The supply voltage, \( V_{cc} \).
   \[ 15V \]

b) The collector-emitter voltage and collector current at the Q-point at which \( I_B = 0.3\text{mA} \) (the base current is shown in 0.1mA steps).
   \[ 8.3V, 56\text{mA} \]

c) The value of the load resistance.
   \[ 15/125\text{mA} = 120\text{ ohms} \]

d) The transistor ac beta near a Q-point at which \( V_{ce} = 6V \).
   \[ (85 - 70)\text{mA}/(0.5 - 0.4)\text{mA} = 150 \]