1) The Class A amplifier has a load line and Q-point as shown. Determine the power situation.

a) What is the Pi?
b) What is the maximum Po when the amp is operated at this Q-point?
c) What is the maximum Po when the amp is operated at a Q-point of 10v and 4ma?

\[ P_i = VCC \times ICQ = 20V \times 2mA = 40mW \]
\[ P_o = \frac{V_{rms}^2}{R} \quad R = \frac{20}{8mA} = 2500 \]
\[ = \frac{(5/2)^2}{2500} = 5mW \quad \text{or,} \]
\[ P_o = \frac{(V_{cemax} - V_{cemin})(I_{cmax} - I_{cmin})}{8} \]
\[ = \frac{(20-10)(4 - 2)}{8} = 5mW \]

\[ P_o = (20 - 0)(8 - 0)/8 = 20mW \quad \text{and} \quad P_i = 20V \times 4mA = 80mW \]
2) Calculate the lower and upper cutoff frequencies of this bandpass circuit.

\[ f_{\text{lower}} = \frac{1}{2\pi R_6 C_1} = 1.592 \text{ kHz} \]

\[ f_{\text{upper}} = \frac{1}{2\pi R_3 C_2} = 2.122 \text{ MHz} \]

3) For a reference voltage of 24V, calculate the output voltage for an input to the circuit of 01110

\[ V_o = 24V \times \frac{0 + 2 + 4 + 8 + 0}{32} = 10.5V \]
4) Determine the following,

a) The frequency of this oscillator is 400 kHz. What is the value of the capacitor, C?

\[ f = \frac{1.44}{(R_A + 2R_B)C} \]

\[ C = 0.16\text{nF} \]

b) This single shot has a pulse width of 35µs. \( R_A = 7.5\text{K} \). What is the value of the capacitor, C?

\[ T(\text{high}) = 1.1R_A*C \]

\[ C = 4.24\text{nF} \]