A one-stage amplifier represented as a box in the figure below will be designed so that symmetrical clipping is provided at the output. The maximum amplitude before the output signal clips and the corresponding input signal is shown below.
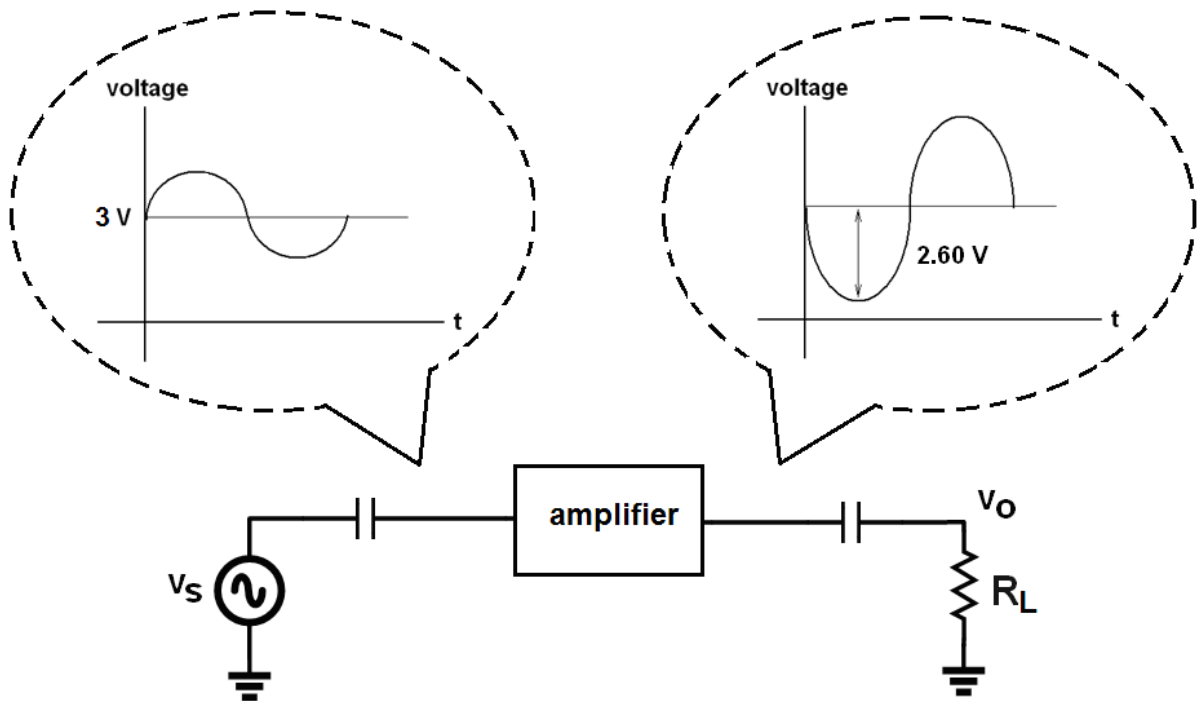Assume R_L=10 kΩ, V_{CC}=9 V, V_{BE}=0.7 V, V_{CEsat}=0, V_T=26 mV.

a) Specify the type of amplifier inside the box. Explain your reasoning. Sketch the full amplifier circuit using an npn type BJT and passive components only (ignore the input bias circuitry but give the bias value).

b) Find your bias point (I_C and V_{CE}) and the resistor values. Explain in detail your design steps.
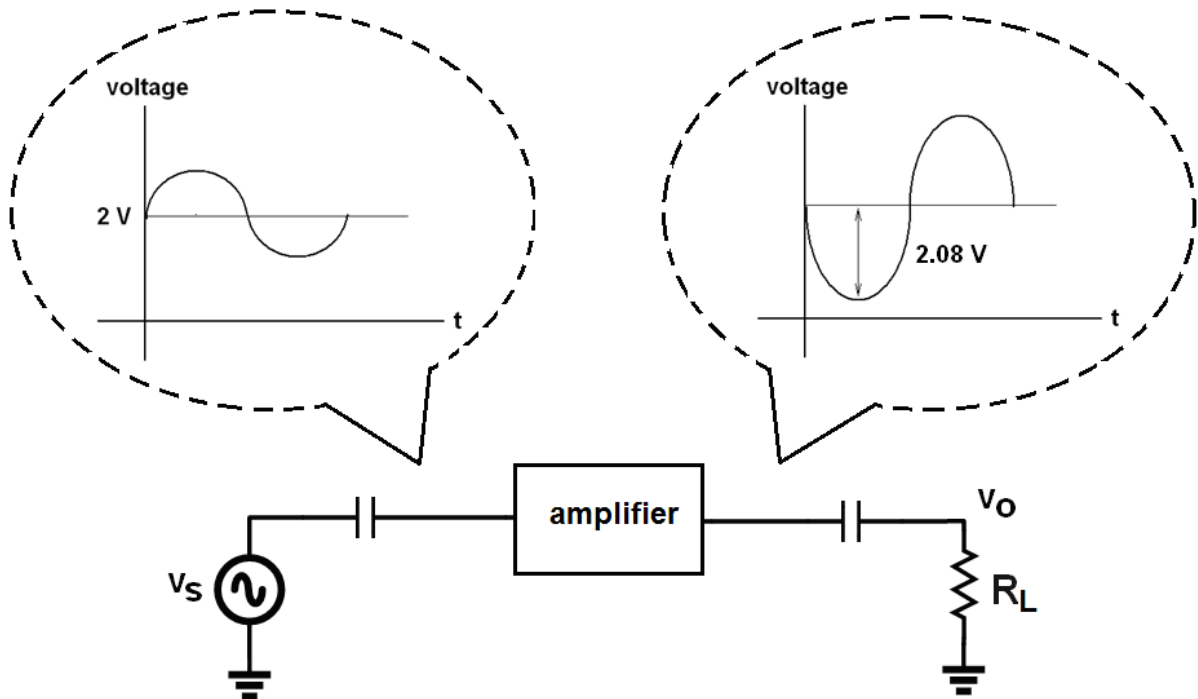
A one-stage amplifier represented as a box in the figure below will be designed so that symmetrical clipping is provided at the output. The maximum amplitude before the output signal clips and the corresponding input signal is shown below.
Assume R_L=12 kΩ, V_{CC}=10 V, V_{BE}=0.7 V, V_{CEsat}=0, V_T=26 mV.

a) Specify the type of amplifier inside the box. Explain your reasoning. Sketch the full amplifier circuit using an npn type BJT and passive components only (ignore the input bias circuitry but give the bias value).

b) Find your bias point (I_C and V_{CE}) and the resistor values. Explain in detail your design steps.

voltage

3 V

t

voltage

2.60 V

t

amplifier

V_S

V_O

R_L

A one-stage amplifier represented as a box in the figure below will be designed so that symmetrical clipping is provided at the output. The maximum amplitude before the output signal clips and the corresponding input signal is shown below.
Assume R_L=5 kΩ, V_{CC}=5 V, V_{BE}=0.7 V, V_{CEsat}=0, V_T=26 mV.

a) Specify the type of amplifier inside the box. Explain your reasoning. Sketch the full amplifier circuit using an npn type BJT and passive components only (ignore the input bias circuitry but give the bias value).

b) Find your bias point (I_C and V_{CE}) and the resistor values. Explain in detail your design steps.