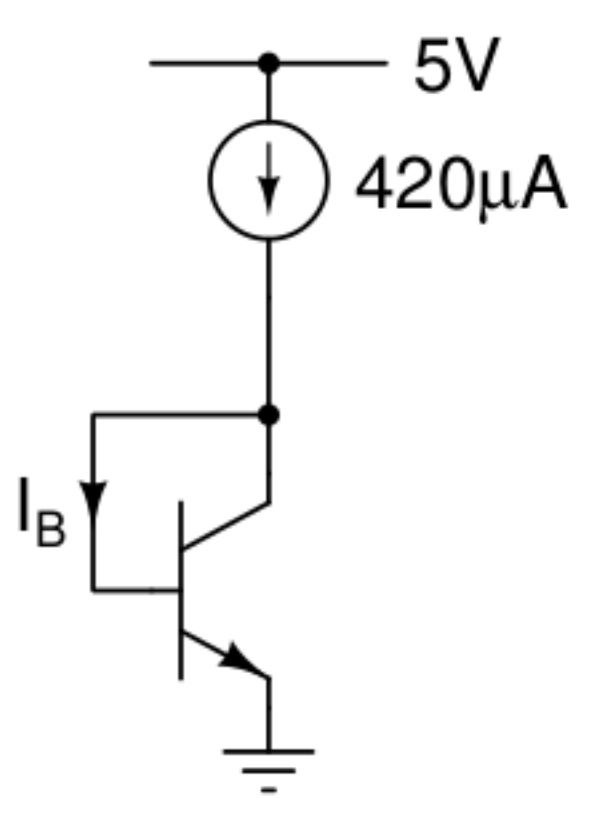
Unit 14 - Week 12 - Bipolar transistors

Assignment 12

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-04-22, 23:59 IST.

1)



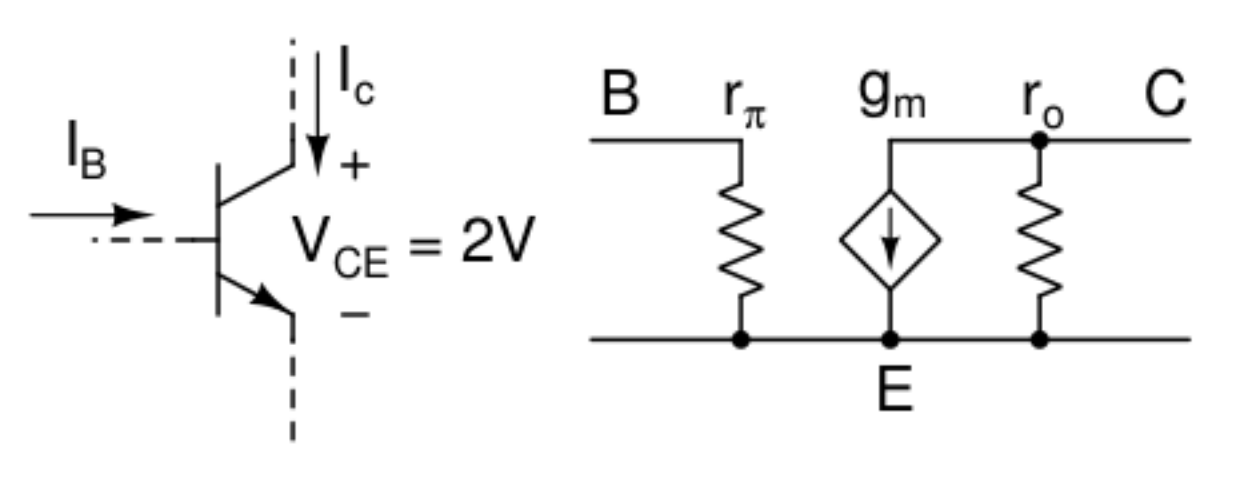
$\beta_n = 20$. Determine the base current I_B in the circuit above.

(The answer must be **in microamperes** (μA). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 20

1 point

2)



Determine r_π and g_m at the operating point calculated in the previous problem. Use $V_t \approx 25\,\text{mV}$. $V_A = 10\,\text{V}$.

For your reference, the small signal parameters are related to the operating point as given in the expressions below.

$$r_\pi = \frac{1}{\partial I_B/\partial V_{BE}} = \beta_n \frac{V_t}{I_C}$$
$$g_m = \frac{\partial I_C}{\partial V_{BE}} = \frac{I_C}{V_t}$$
$$r_o = \frac{1}{\partial I_B/\partial V_{CE}} \approx \frac{V_A}{I_C}$$

Value of r_π

(The answer must be **be in ohms** (Ω). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1250

1 point

3) Value of g_m

(The answer must be **be in millisiemens (mS)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 16

1 point

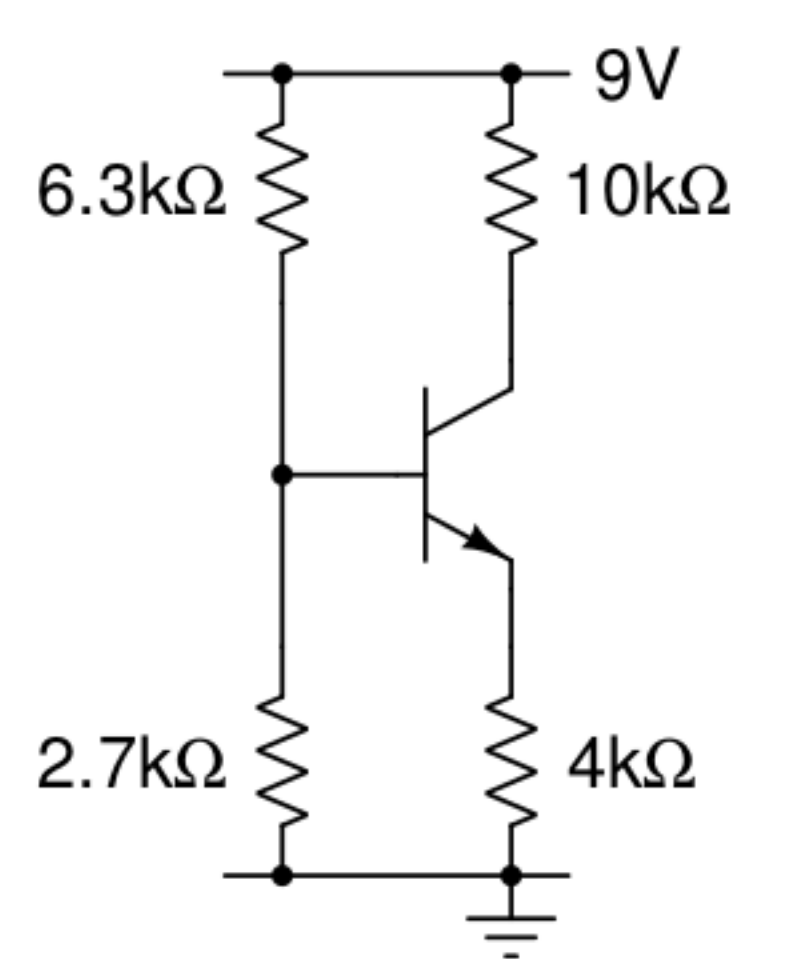
4) Value of r_o

(The answer must be **be in kilohms** (kΩ). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 25

1 point

5)



$\beta_n = \infty$, $V_A = \infty$ (In general, if values of β_n or V_A are not specified, use ∞ and proceed with the calculations.). $V_{BE,on} = 0.7\,\text{V}$. $V_t \approx 25\,\text{mV}$.

Calculate the collector current I_C at the operating point above.

(The answer must be **in microamperes** (μA). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 500

1 point

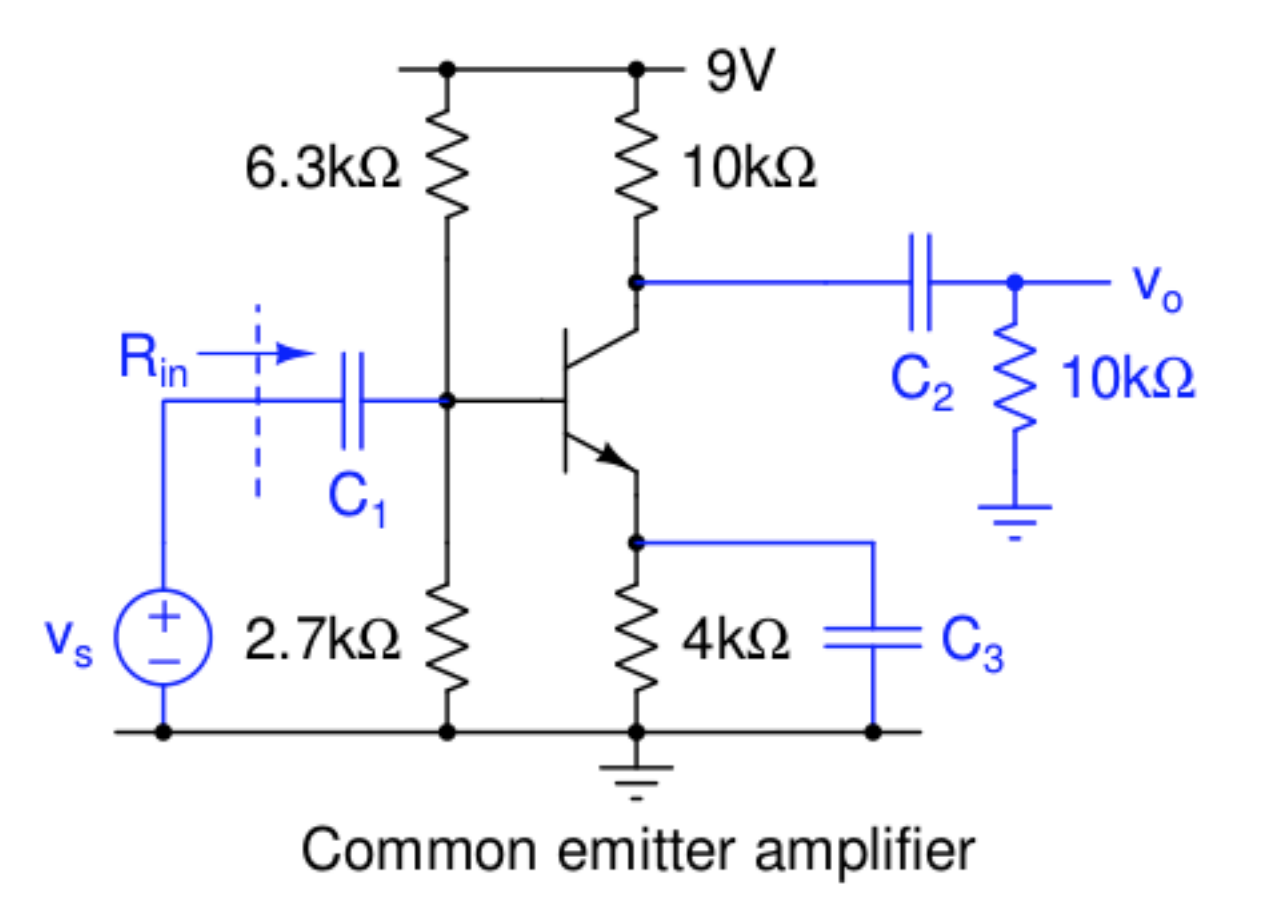
6) Calculate V_{CE} at the operating point above.

(The answer must be **in volts** (V). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 2

1 point

7)



Common emitter amplifier

Calculate the small signal gain v_o/v_s in the circuit above. For your convenience, it uses the same operating point as in the previous problem. Assume that the capacitors are shorts at the signal frequency.

(The answer must be **the value of the gain**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) -100

1 point

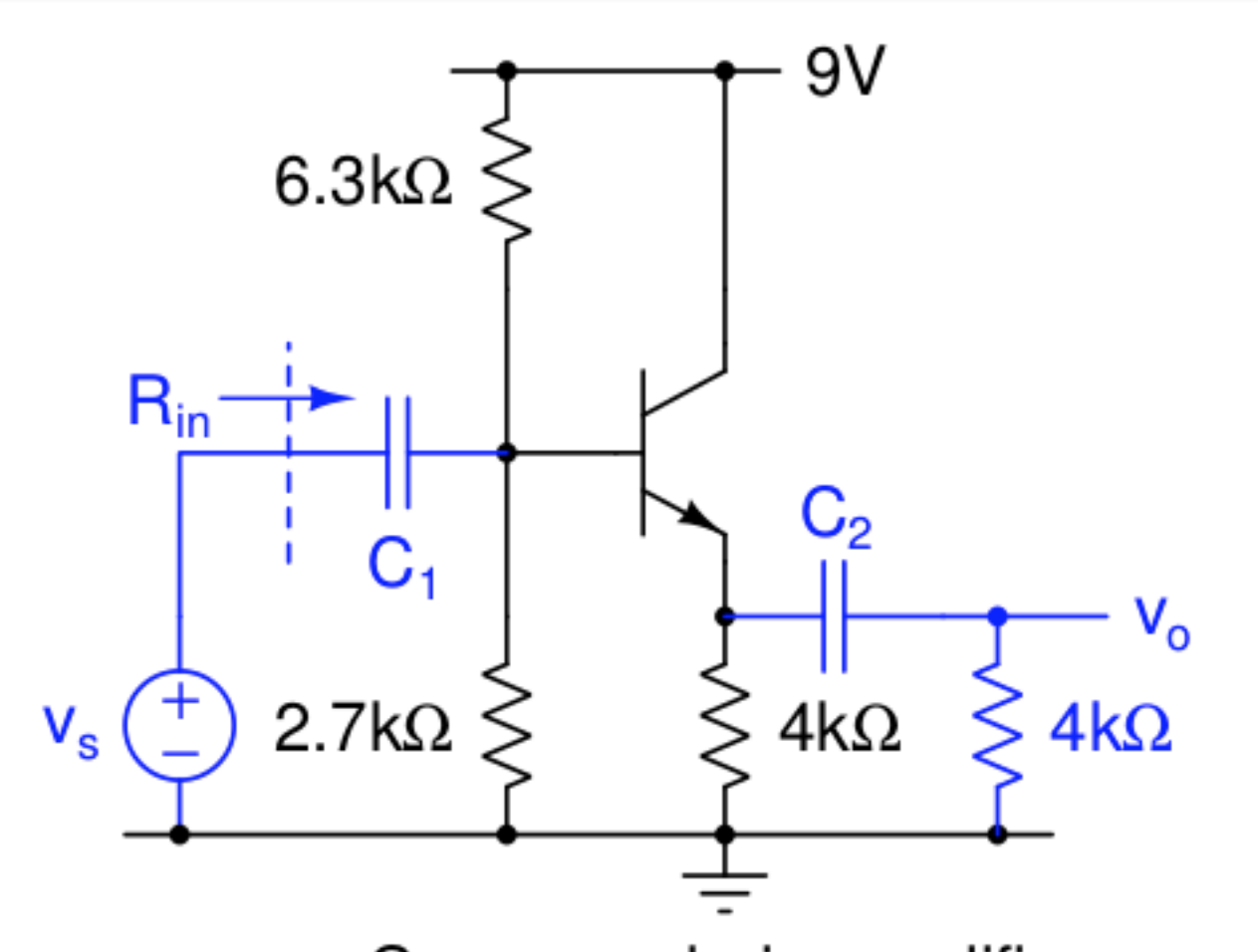
8) Calculate the small signal input resistance R_{in} in the circuit above. For your convenience, it uses the same operating point as in the previous problem. Assume that the capacitors are shorts at the signal frequency.

(The answer must be **be in kilohms** (kΩ). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.8,1.9

1 point

9)



Common drain amplifier

Calculate the small signal gain v_o/v_s in the circuit above. For your convenience, it uses the same operating point as in the previous problem. Assume that the capacitors are shorts at the signal frequency.

(The answer must be **the value of the gain**. Round off fractional answers to two decimal places.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.97,1

1 point

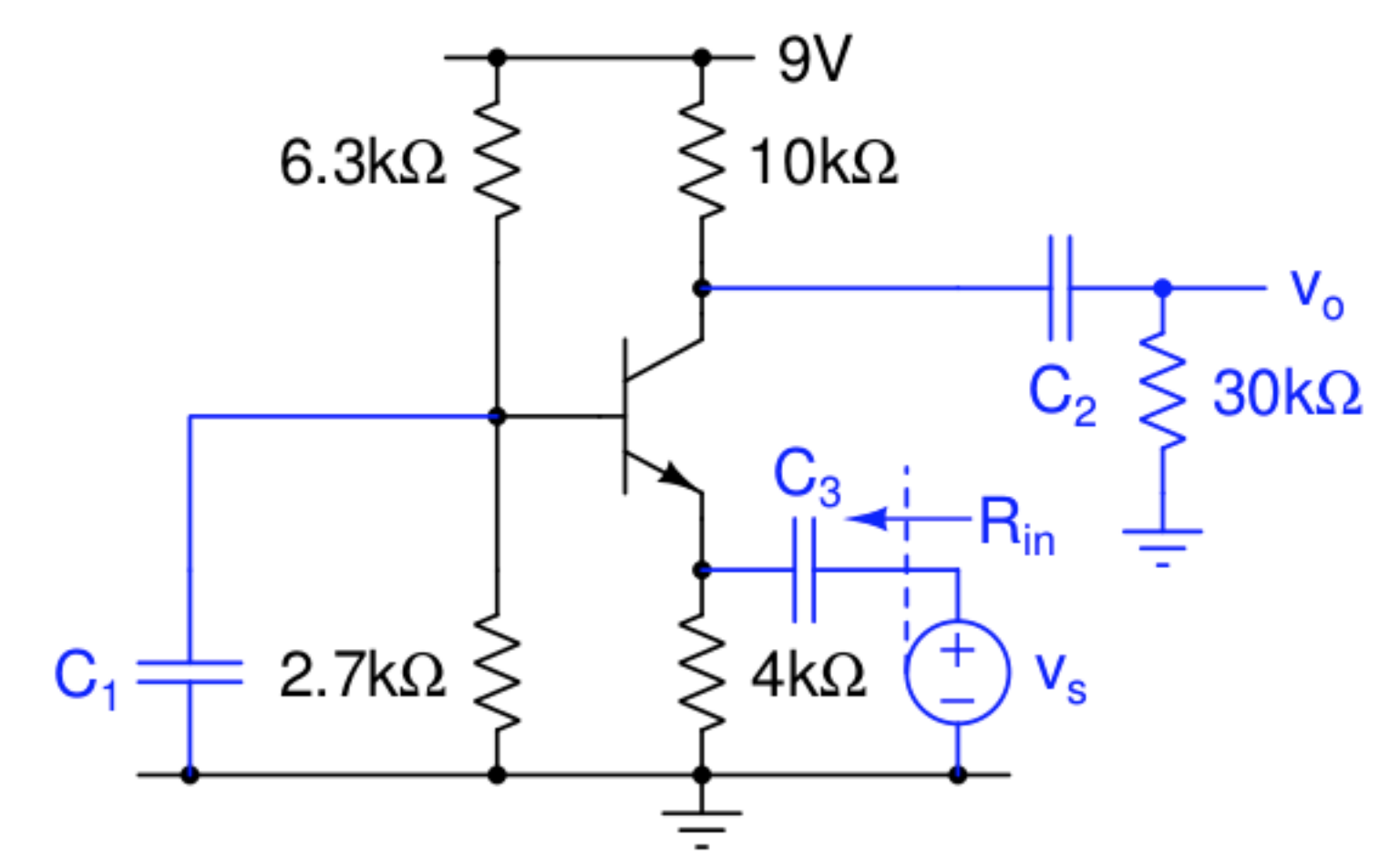
10) Calculate the small signal input resistance R_{in} in the circuit above. For your convenience, it uses the same operating point as in the previous problem. Assume that the capacitors are shorts at the signal frequency.

(The answer must be **be in kilohms** (kΩ). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1.9

1 point

11)



Common drain amplifier

Calculate the small signal gain v_o/v_s in the circuit above. For your convenience, it uses the same operating point as in the previous problem. Assume that the capacitors are shorts at the signal frequency.

(The answer must be **the value of the gain**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 150

1 point

12) Calculate the small signal input resistance R_{in} in the circuit above. For your convenience, it uses the same operating point as in the previous problem. Assume that the capacitors are shorts at the signal frequency.

(The answer must be **be in ohms** (Ω). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 49,50

1 point