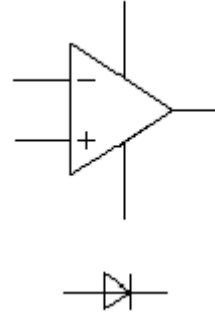


1 Link the name of each **terminal** to its position on the **circuit symbol**.

- terminal**
- anode
- output
- cathode
- inverting input
- top supply rail
- bottom supply rail
- non-inverting input

circuit symbol



2 Complete the sentences for an op-amp. Choose from these words.

- current inverting non-inverting saturates supply rails voltage**

The output of an op-amp _____ at +13 V or -13 V when it is run off _____ at +15 V and -15 V. The output is only +13 V when the _____ at the _____ input is above that of the _____ input. The _____ at the inputs is zero.

3 Complete the table for an ideal silicon diode. Choose from these values.

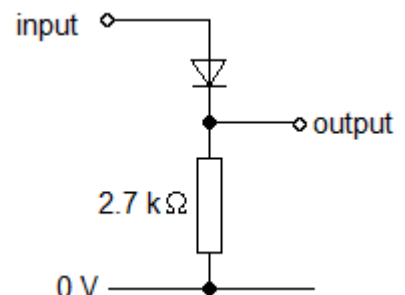
- < 0.7 0 > 0 0.7 large small**

bias	voltage / V	current / mA	resistance / Ω
forward			
reverse			

4 Complete the sentences for the circuit shown opposite.

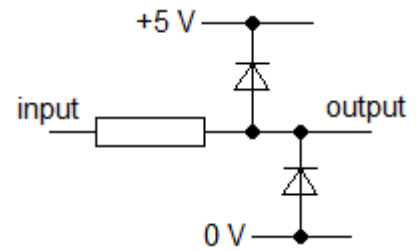
When the input is at +13 V, the diode is in _____ bias. The voltage drop across it is _____ V, so the output is at _____ V. The current in the resistor is therefore _____ mA.

A voltage of -13 V at the input puts the diode in _____ bias, so the current in the resistor is _____ mA, leaving the output terminal at _____ V.



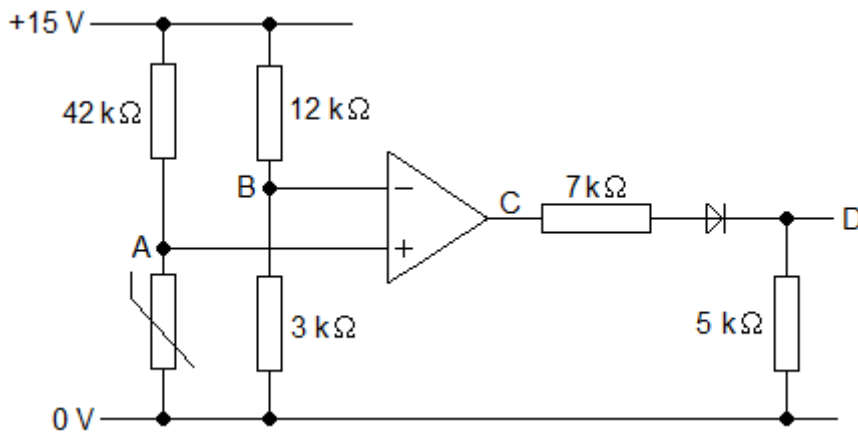
5 Complete the table for this circuit.

input voltage	output voltage
-9 V	
-3 V	
+3 V	
+9 V	



6 Complete the sentences for this circuit. Choose from these words.

- 13 V 0 V +3 V +5 V +13 V
 above below forward resistance reverse



The voltage at B is a constant _____ .
 The voltage at A depends on the _____ of the thermistor.
 When the thermistor is hot, the voltage at A will be _____ the voltage at B, making C saturate at _____. This puts the diode in _____ bias, placing D at _____.
 When the thermistor is cold, the voltage at A will be _____ the voltage at B, making C saturate at _____. This puts the diode in _____ bias, placing D at _____.

7 The ideal zener diode is rated at 6.8 V, 150 mW.
 Which of these statements is true for the circuit?

- Z cannot go below 6.8 V.
- Z cannot rise above 6.8 V.
- W can vary from 0 V to 15 V.
- The current in the resistor is 22 mA.
- There is always current in the resistor.
- The voltage at W is always above that at Z.

