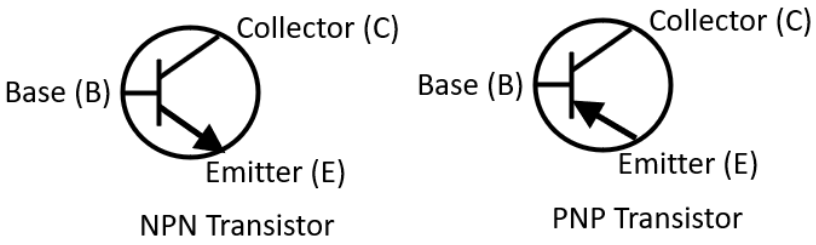
Jules' Workshop

Standard

Unit 10 – Answers

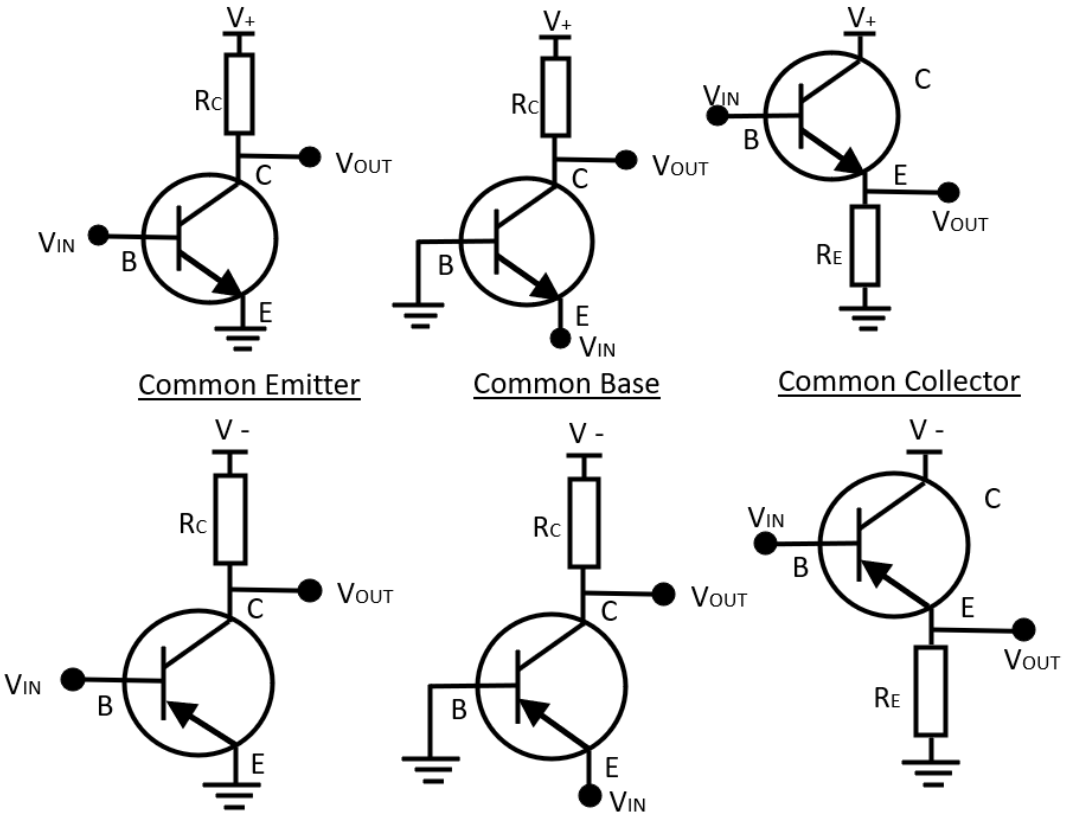
Q1 Draw NPN and a PNP transistor naming the terminals.



Q2 Complete the table below.

	Symbol	Explanation
Collector current	I_C	Current through the collector
Base Current	I_B	Current through the base
Emitter current	I_E	Current through the emitter
Turn on voltage	V_{BE}	VBE(sat) is the required base voltage that must be present in order to forward-bias the transistor's base/emitter junction (i.e., to turn the transistor on). Generally speaking, this value is between .6 to .7 volts for a general-purpose transistor.

Q3 Draw the following diagrams for either NPN or PNP transistors. Include the characteristics of each configuration.



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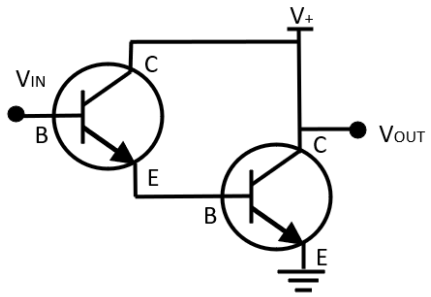
Configuration	Input Impedance	Output impedance	Gain	Orientation
Common Emitter	Medium	High	High	Inverting
Common Base	Low	High	Unity	Non - inverting
Common Collector	High	Low	High	Non - inverting

Q4 What is a Darlington pair?

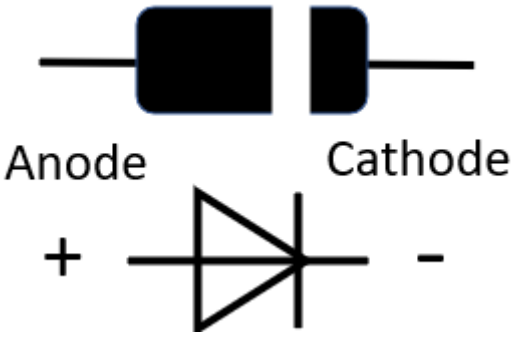
A Darlington pair is a circuit consisting of two bipolar transistors with the emitter of one transistor connected to the base of the other. The collectors of both transistors are connected together and this gives a much higher current gain than each transistor taken separately. This is usually sold as a single transistor package.



Darlington Pair

Q 5 PIV is the Peak Inverse voltage or Peak Reverse Voltage (PRV) is the maximum voltage a diode can withstand in the non-conducting (reverse-biased) direction before breakdown.

Q 6 What is a diode and draw the symbol?



Q7 What is a Zener diode and how does it work?

A Zener diode is a special type of diode designed to reliably allow current to flow "backwards" (inverted polarity) when a certain set reverse voltage, known as the Zener voltage, is reached.

Q8 What is the forward bias of a diode?

This is the point at which the diode will start conducting in the forward direction.

Q9 Draw a diode symbol and indicate the direction of current flow for a normal diode.

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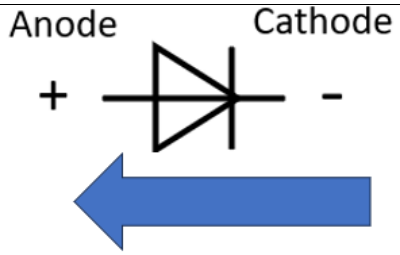

Q10 What is a Schottky diode and why are they used?

The Schottky diode is formed by the junction of a semiconductor with a metal. It has a low forward voltage drop and a very fast switching action.

Diodes have a forward voltage drop of about 0.7 V and germanium diodes 0.3 V, Schottky diodes' voltage drop at forward biases of around 1 mA is in the range of 0.15 V to 0.46 V. This makes them useful in voltage clamping applications and prevention of transistor saturation.

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