




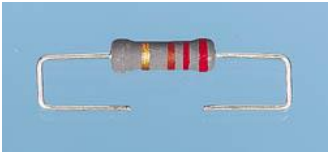


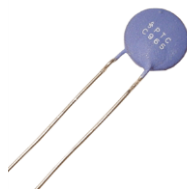
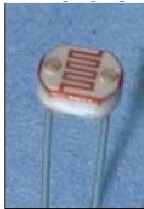


Picture	Symbol	Function
		
		
		
		
		
		
		
		



PositiveOffset.com



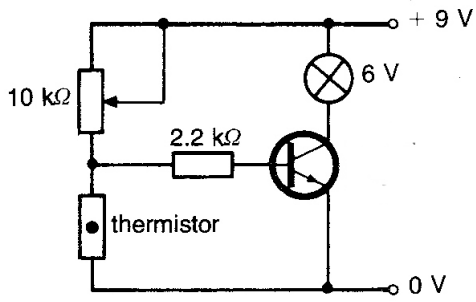
Potential dividers – Will the bulb light?

	<p>Working Out:</p>
	<p>Working Out:</p>
	<p>Working Out:</p>

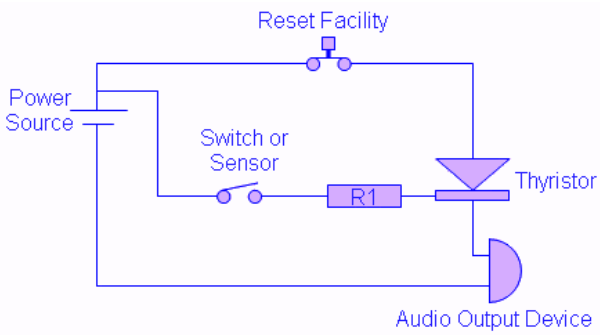
Ohms law

	<p>Calculate the current flowing in this circuit. Working Out:</p>
	<p>Calculate the voltage of the battery. Working Out:</p>
	<p>Calculate the value of the resistor. Working Out:</p>

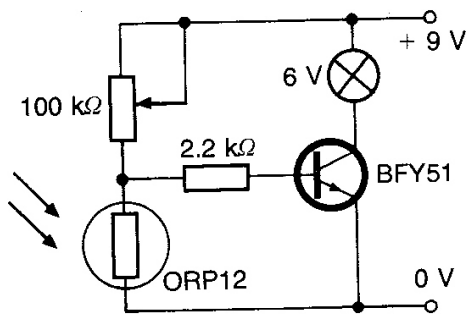
Describe what these circuits do.



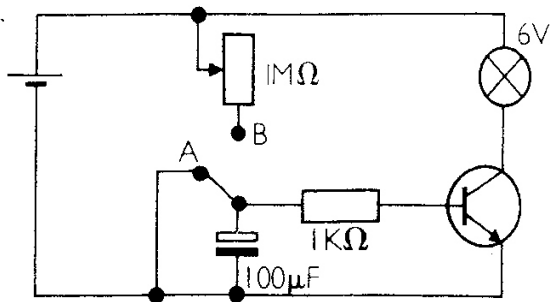
Input :
 Process:
 Output:
 Function:



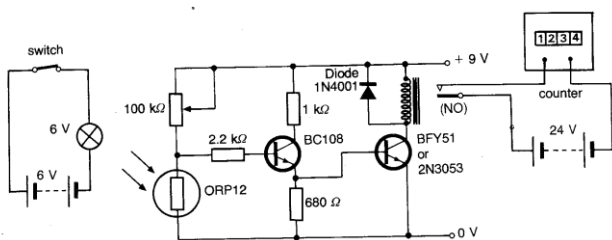
Input :
 Process:
 Output:
 Function:



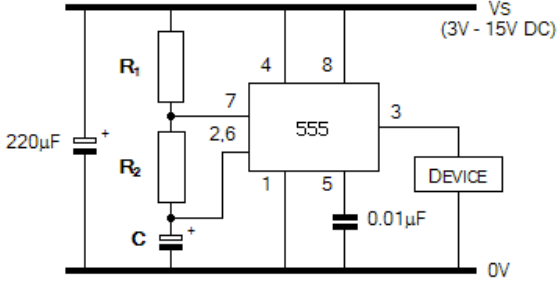
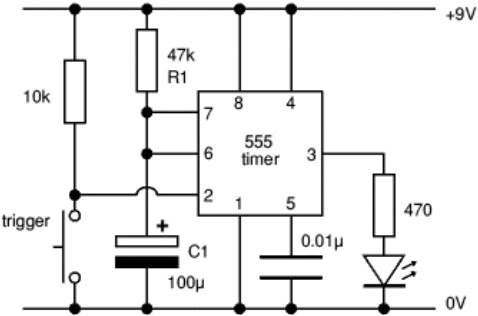
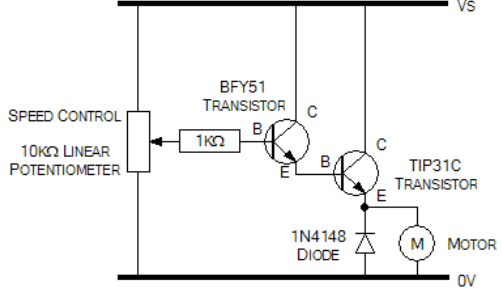
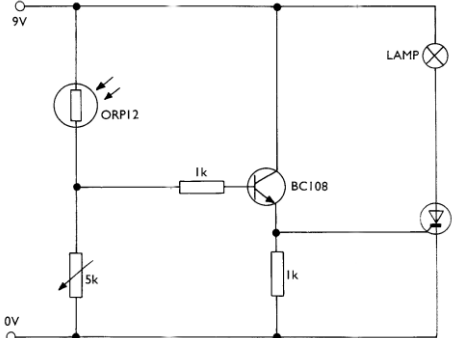
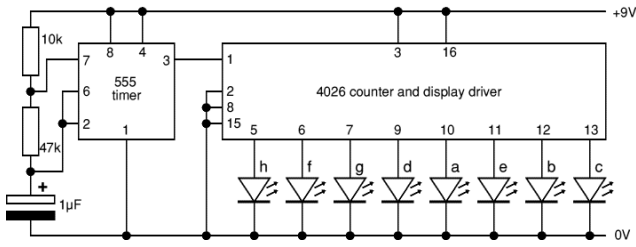
Input :
 Process:
 Output:
 Function:



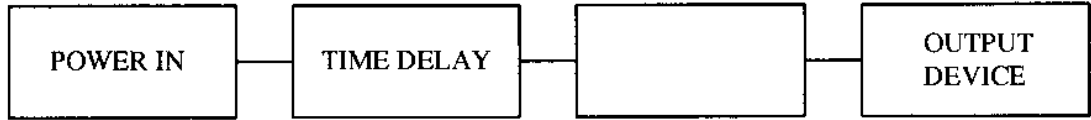
Input :
 Process:
 Output:
 Function:



Input :
 Process:
 Output:
 Function:

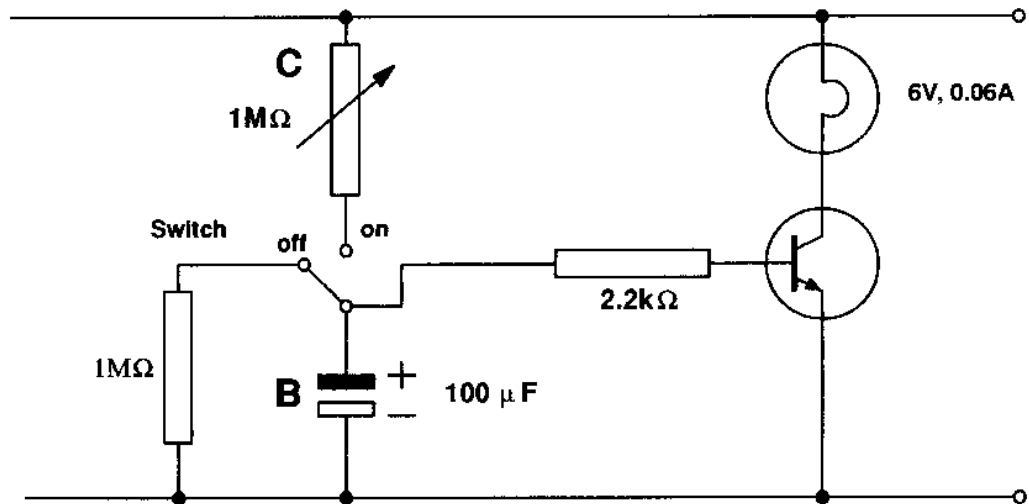
 <p style="text-align: center;">The 555 astable circuit</p>	<p>Input :</p> <p>Process:</p> <p>Output:</p> <p>Function:</p>
	<p>Input :</p> <p>Process:</p> <p>Output:</p> <p>Function:</p>
 <p style="text-align: center;">Darlington pair speed control</p>	<p>Input :</p> <p>Process:</p> <p>Output:</p> <p>Function:</p>
	<p>Input :</p> <p>Process:</p> <p>Output:</p> <p>Function:</p>
	<p>Input :</p> <p>Process:</p> <p>Output:</p> <p>Function:</p>

3. (a) A student decides to make an electronic timer to show when an exercise has been done for a set length of time.
To help in the design of the system a block diagram was produced as shown below.



Fill in your suggestion in the **third** block to complete the system. [1]

- (b) A possible circuit design is shown below.



Draw **three circles** on the circuit diagram and label them, to show the position of any **three block diagram elements**. [3]

- (c) Name the components labelled **B** and **C**. [2]

Component **B**

Component **C**

(d) When the switch is placed in the **on** position, what happens to: [3]

(i) the component marked **B**;

.....

(ii) the transistor;

.....

(iii) the signal lamp?

.....

(e) What does the term *gain* mean when applied to a transistor? [2]

.....
.....

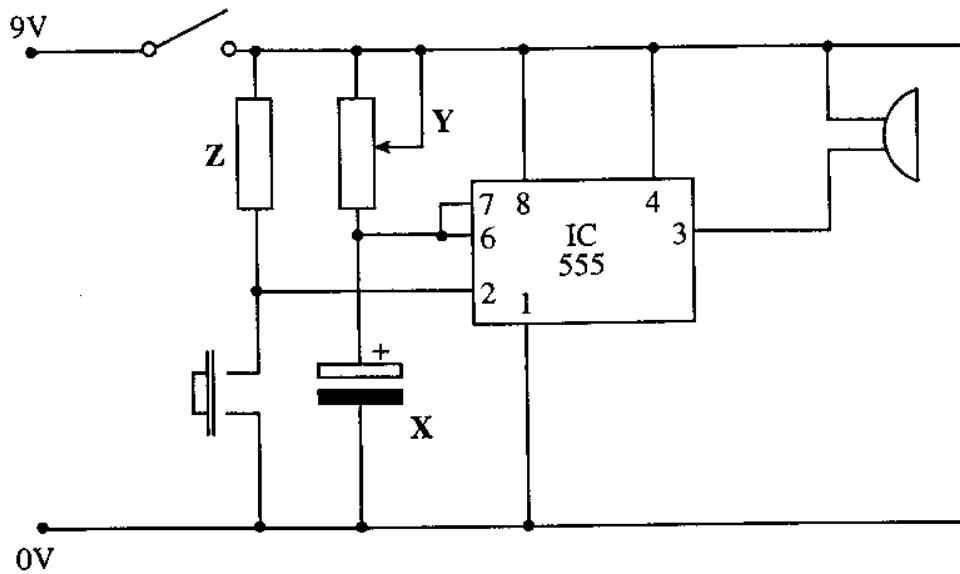
(f) If the signal lamp was changed for a buzzer, what additional component would need to be added to the circuit to protect the transistor? [1]

.....

(g) (i) The circuit shown in part (b) of this question is an analogue circuit. Explain the difference between analogue and digital circuits. [2]

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.....
.....
.....

3. (a) A kitchen timer makes use of the electronic circuit shown below.

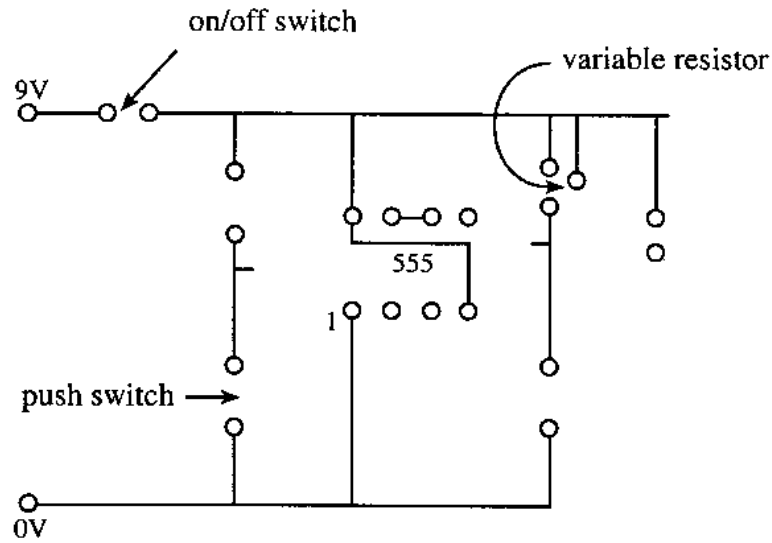


- (i) Name a component which forms an *input* to the system. [1]
- (ii) Which component forms an *output* of the system? [1]
- (iii) State whether pin 3 is *sinking* or *sourcing* current. [1]
- (iv) Name the **three** components labelled **X**, **Y** and **Z** [3]
 - X**
 - Y**
 - Z**
- (v) In what way is the 555 IC being used? [1]

Circle the correct answer from the following list:

ASTABLE INVERTING BUFFER MONOSTABLE

- (b) A student decides to construct the kitchen timer circuit using a printed circuit board. Part of the PCB design is shown below.

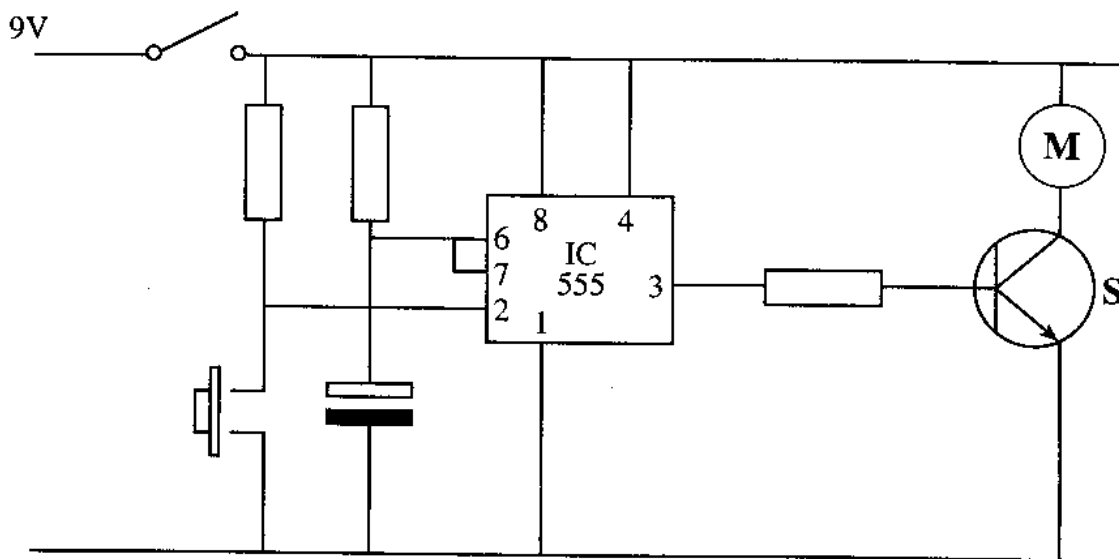


- (i) Complete the PCB design by adding the **three** missing tracks. [3]
- (ii) Label the positions where **each** component will fit. (*Some are done for you.*) [3]
- (iii) Give **one** possible reason why the student chose to use a printed circuit board rather than any other method of construction. [1]

Reason

.....

- (c) The same basic timing circuit could be used to make an electric motor turn for a set period each time a button is pressed. The circuit is shown below.



- (i) Name component S. [1]

Component S is a

- (ii) Why has component S been added to the circuit? [2]

.....

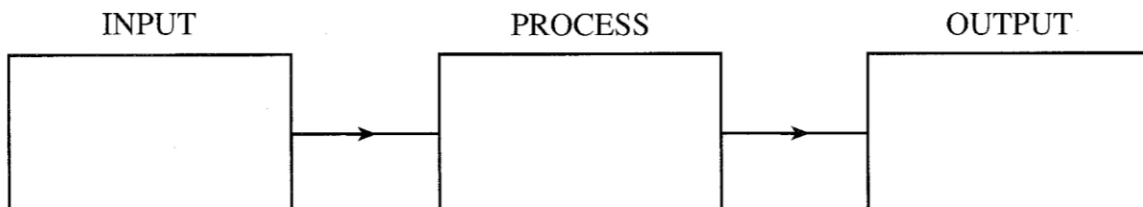
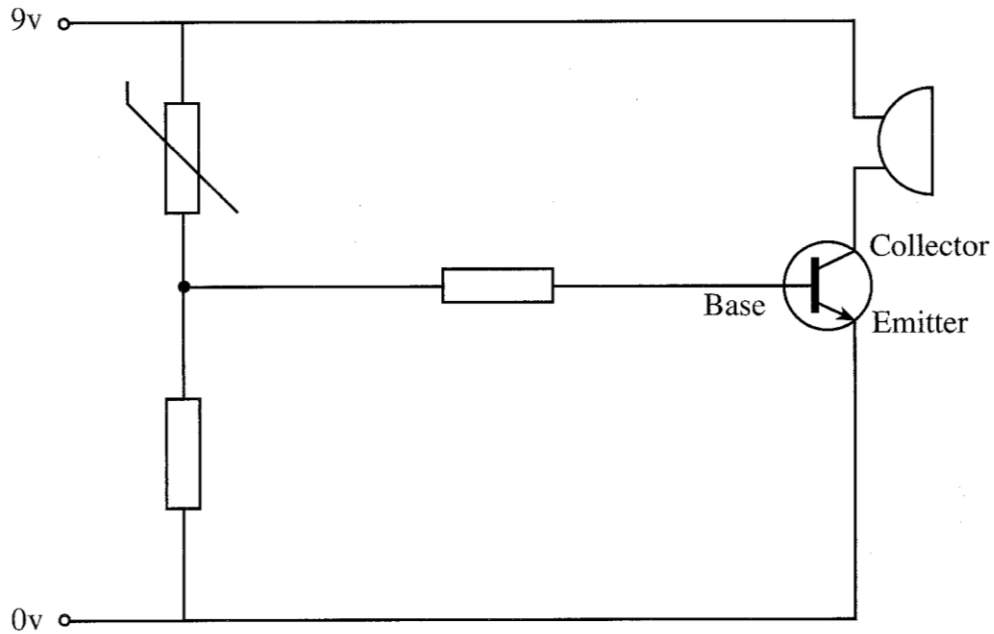
- (iii) The calculation used to determine the time delay in this circuit is given by the expression $T=1.1RC$ where T represents the time (in seconds), R represents value of the resistor (in ohms) and C represents the value of the capacitor (in farads).

A time delay of 20 seconds is needed and a capacitor (C) of 2200 μF is available. Calculate the value of the resistor that is required. [3]

(Show all stages of your working.)

.....

3. The circuit diagram for a basic temperature alarm is shown below along with its block diagram.
- (a) **Complete** the block diagram by adding the names of the components that form the input, process and output. [3]



- (b) **Complete** the following sentences by **underlining** the correct word from the choice offered in the brackets. [3]
- (i) A transistor is a (SEMI-CONDUCTOR / TIMING) device.
- (ii) A small current must flow into the (BASE / COLLECTOR / EMITTER) leg for the transistor to switch on.
- (iii) A transistor can be used to (AMPLIFY / REVERSE) current.

(c) A student wants to model this circuit to see how it works. **Describe two** ways the student could do this without soldering any components together. [4]

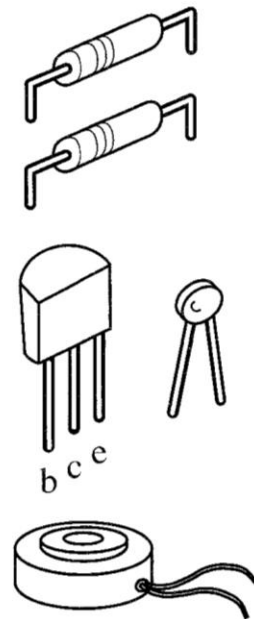
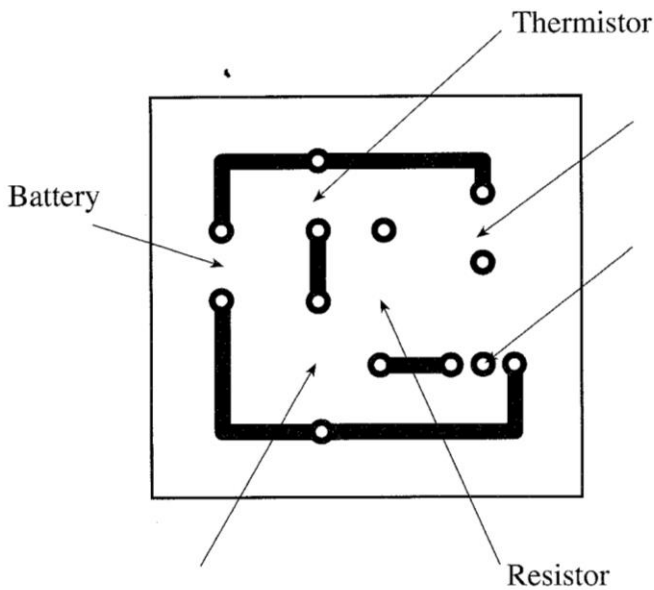
1st way:

.....

2nd way:

.....

(d) The student decides to make the final circuit using a printed circuit board (PCB). Part of the design is sketched below together with the components needed.



(i) **Two** tracks are missing from the PCB. **Draw** them into place. [2]

(ii) **Complete** the labels showing where the components fit into the PCB. [3]

(e) PCBs are found in most modern electronic devices. **Give two** advantages of using a PCB to manufacture an electronic circuit. [4]

Advantage 1:

.....

Advantage 2:

.....