YEAR 9 LOUD SPEAKER SYSTEM

ROSTREVOR COLLEGE

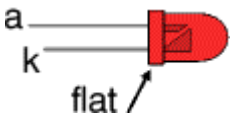
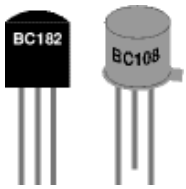
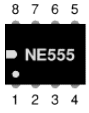
SYSTEMS AND CONTROL TECHNOLOGY

NAME _____ DATE _____

PC TEACHER _____ D&T TEACHER _____

COMPONENT IDENTIFICATION

1) FOR EACH OF THE FOLLOWING DRAW THE SCHEMATIC AND PCB SYMBOL.

Components	Pictures	PCB Symbol	Schematic Symbol	Reminders and Warnings
Resistors				Use component bending tool. Don't just bend with fingers. Observe colour codes
Electrolytic Capacitors				**Polarised** (+) Leg will be longer.
Polyester Capacitor				**Non polarised** Can be inserted either orientation.
Diodes				**Polarised** Connect the correct way round. Ring should align with PCB symbol.
LEDs				**Polarised** Ensure it is orientated the correct way. (+) Leg longer. Flat side is (-).
Transistors				Transistors have 3 legs so extra care is needed to ensure the connections are correct. Easily damaged by heat.
Wire Link	 single core wire			Only use single core wire if connection will not be disturbed.
IC (Integrated circuit)				Observe notch and ensure correct orientation. Generally place in IC Socket Easily damaged by heat.

2) WATCH THE YOUTUBE VIDEO, "MAKE PRESENTS: THE RESISTOR" BY MAKEMAGAZINE AND ANSWER THE FOLLOWING:

a) WHAT DOES A RESISTOR DO? _____

_____

b) WHAT IS THE BODY OF THE RESISTOR MADE FROM? _____

_____

c) WHAT IS RESISTANCE MEASURED IN? _____

_____

d) WHAT THREE IMPORTANT RELATIONSHIPS MAKE UP OHMS LAW? _____

_____

e) WHAT NUMBER DOES THE COLOUR GREEN STAND FOR? _____

_____

f) HOW CAN YOU MAKE YOUR OWN RESISTOR? _____

_____

3) WATCH THE YOUTUBE VIDEO, "MAKE PRESENTS: THE CAPACITOR" BY MAKEMAGAZINE AND ANSWER THE FOLLOWING:

a) NAME A FEW CAPACITOR TYPES: _____

_____

b) WHAT IS INSIDE AN ELECTROLYTIC CAPACITOR? _____

_____

c) WHAT WAS THE FIRST BASIC CAPACITOR MADE FROM? _____

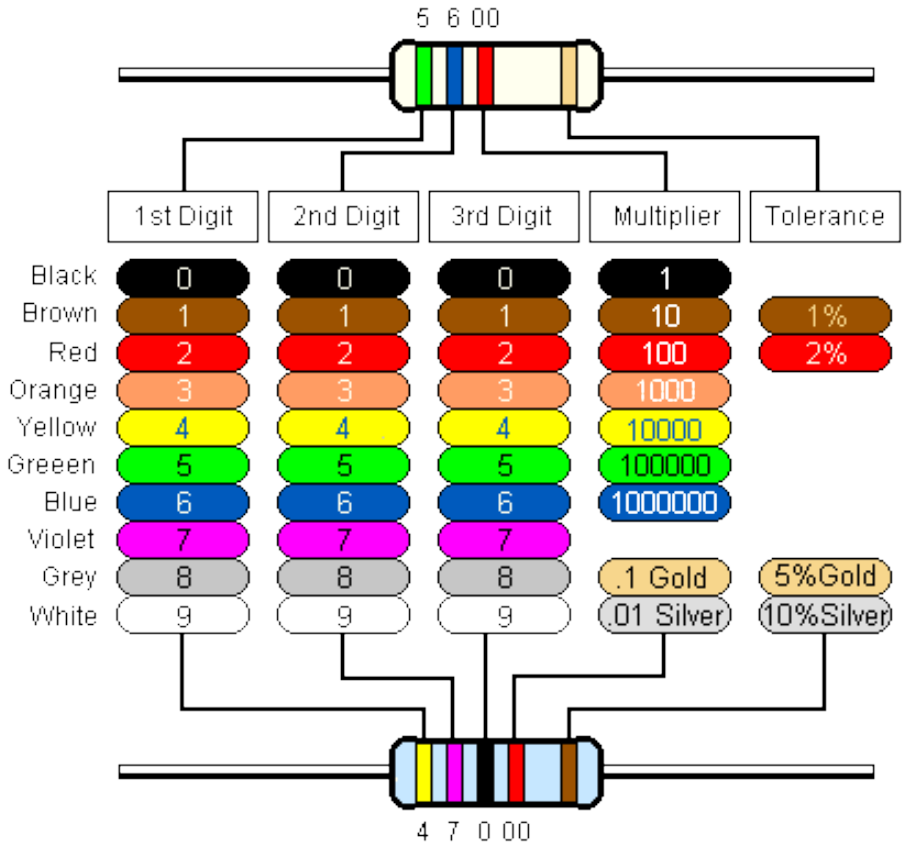
_____

d) WHAT IS A CAPACITANCE MEASURED IN? _____

_____

WHAT IS ONE FUNCTION OF A CAPACITOR? _____

_____



4) RESISTOR COLOUR QUIZ: FOR THE FOLLOWING EXAMPLES COVERT THE COLOUR CODE TO WORK OUT THE VALUE OF THE RESISTOR.

a) YELLOW, PURPLE, RED, GOLD = _____

b) BROWN, BLACK, RED, GOLD = _____

c) RED, RED, ORANGE GOLD = _____

d) GREEN, BLUE, BLACK, GOLD = _____

5) FOR THE FOLLOWING EXAMPLE CONVERT THE VALUE OF THE RESISTOR TO THE COLOUR CODE:

a) 330 Ω 5% = _____

b) 270 Ω 5% = _____

c) 1K Ω 5% = _____

d) 47K Ω 5% = _____

SCIENTIFIC NOTATION

Prefix	Symbol	Value	Decimal Value
Giga	G	x 10^{9}	1 000 000 000
Mega	M	x 10^{6}	1 000 000
Kilo	K	x 10^{3}	1 000
		1	1
Milli	m	x 10^{-3}	0.001
Micro	u	x 10^{-6}	0.000001
Nano	n	x 10^{-9}	0.000000001
Pico	p	x 10^{-12}	0.000000000001

Scientific Notation uses number to simplify the representation of number so that are easy to read without having to count the amount of zeros.

An example is that if you ran 100 meters we would write it down as 100m. If you ran 1000 meters we would write is as 1Km, and if you ran 2200 meters you would write is as 2.2Km.

Likewise if you were using a capacitor that was 0.000001 Farads we can move the decimal 6 places to the right to simplify the number to 1uF.

We can also see that 1000p = 1n, 1000n = 1m and so on.

6) CONVERT THE FOLLOWING PREFIX'S TO SIMPLIFY THE NUMBER

a) 1000N = _____

b) 2200N = _____

c) 0.0022N = _____

A NUMBER CODE IS OFTEN USED ON SMALL CAPACITORS WHERE PRINTING IS DIFFICULT:

- THE 1ST NUMBER IS THE 1ST DIGIT,
- THE 2ND NUMBER IS THE 2ND DIGIT,
- THE 3RD NUMBER IS THE NUMBER OF ZEROS TO GIVE THE CAPACITANCE IN PF.
- IGNORE ANY LETTERS - THEY JUST INDICATE TOLERANCE AND VOLTAGE RATING.

FOR EXAMPLE 102 WOULD EQUAL 10 THEN TWO ZEROS, THEREFORE 1000PF = 1NF

7) CAPACITOR CODE QUIZ: FOR THE FOLLOWING EXAMPLES COVERT THE CODE TO WORK OUT THE VALUE OF THE CAPACITOR.

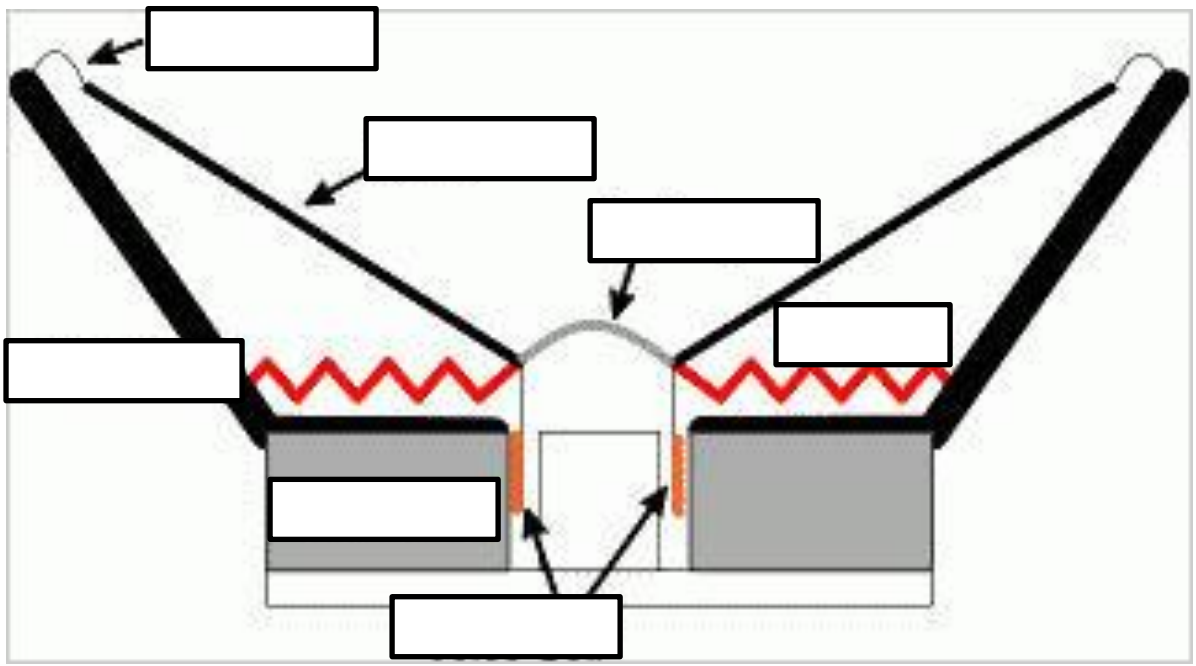
a) 4.7NF = _____

b) 22NF = _____

c) _____ = 476

8) ON THE FOLLOWING CROSS SECTION OF A LOUD SPEAKER IDENTIFY THE FOLLOWING PARTS:

DIAPHRAGM	SPIDER	ENCLOSURE	MAGNETS
DUSTCAP	SUSPENSION	VOICE COIL	

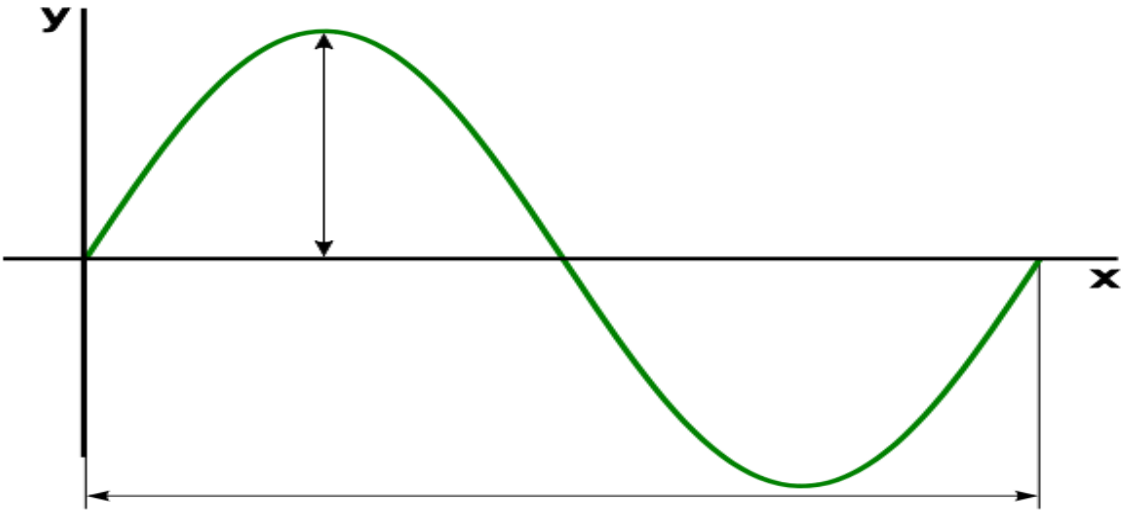


9) DRAW A SIMPLE VISUAL REPRESENTATION OF AN AUDIO SIGNAL ACTIVATING THE VOICE COIL AND ITS REACTION WITH THE PERMANENT MAGNET.

10) DRAW A VISUAL REPRESENTATION OF THE VOICE COIL PUSHING THE DIAPHRAGM AND PUSHING THE AIR PARTICLES AND THE SOUND WAVES ARRIVING IN OUR EAR DRUMS.

11) A MICROPHONE SIGNAL WOULD NEED TO BE AMPLIFIED IN ORDER TO DRIVE A SPEAKER. DRAW A VISUAL REPRESENTATION OF SOMEONE TALKING INTO A MICROPHONE, THE AUDIO SIGNAL BEING AMPLIFIED AND THEN DRIVING A LOUDSPEAKER.

12) ON THE FOLLOWING DIAGRAM IDENTIFY; ONE WAVELENGTH, AND THE AMPLITUDE.



13) HOW IS FREQUENCY DETERMINED? WHAT IS IT MEASURED IN? HOW DO DIFFERENT FREQUENCY'S SOUND?

14) DESCRIBE WHAT HAPPENED TO THE BAR MAGNET WHEN THE COPPER COIL WAS ACTIVATED WITH THE SIGNAL GENERATOR?

SOLDERING

15) SOLDER IS AN ALLOY OF WHICH TWO METALS?

16) WHAT ARE THE FEATURES THAT YOU SHOULD LOOK FOR IN A GOOD SOLDERING JOINT?

17) WHY MUST THE SOLDERING TIP BE TINNED AND CLEAN OF ALL OXIDES/DIRT?

18) WHAT ORDER DID YOU SOLDER THE COMPONENTS TO YOUR CIRCUIT BOARD, WHY?

19) LIST THE EQUIPMENT YOU USED TO MANUFACTURE YOUR AUDIO AMPLIFIER AND DESCRIBE HOW YOU USED IT.

a) _____ - _____

b) _____ - _____

c) _____ - _____

d) _____ - _____

e) _____ - _____

f) _____ - _____

20) PICAXE MICROCONTROLLERS – PLEASE DESCRIBE THE FOLLOWING COMMANDS

a) HIGH _____ - _____

b) LOW _____ - _____

c) PAUSE _____ - _____

d) GOTO (LABEL) _____ - _____

e) IF PUSH IS ON THEN (LABEL) - _____

f) SYMBOL _____ - _____

21) NOTES: