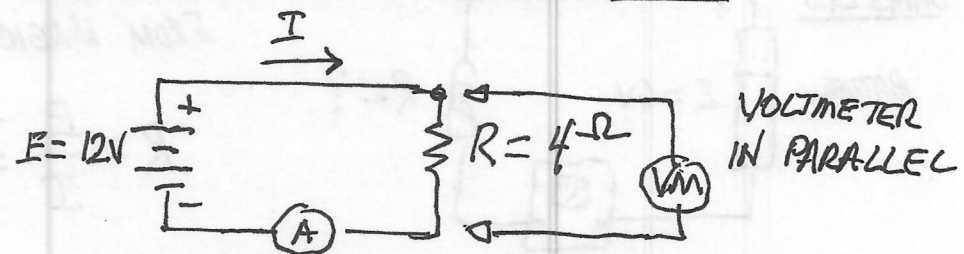


# TECHNICIAN CLASS - CHAPTER 3

## OHMS LAW

### EXAMPLE 1



WHAT IS CURRENT, I? ← AMMETER IN SERIES

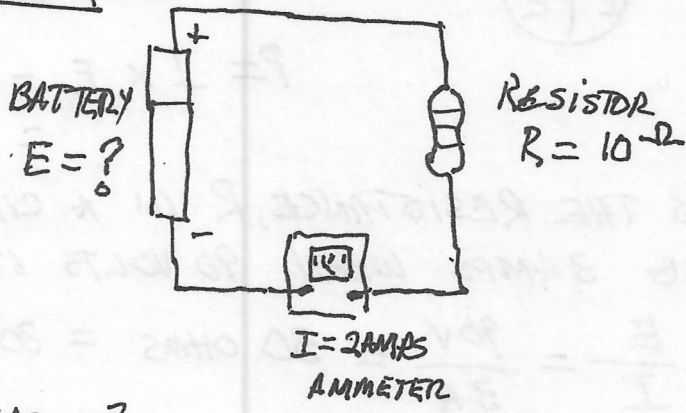


$R = 4\Omega$   
 $I = \frac{E}{R} = \frac{12V}{4\Omega} = 3 \text{ AMPS}$

$R = 3\Omega$   
 $I = \frac{E}{R} = \frac{12V}{3\Omega} = 4 \text{ AMPS}$

$R = 2\Omega$   
 $I = \frac{E}{R} = \frac{12V}{2\Omega} = 6 \text{ AMPS}$

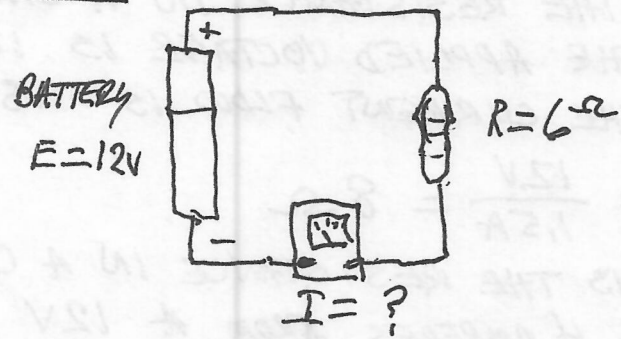
### EXAMPLE 2



FIND E  
FROM MAGIC CIRCLE

$E = I \times R$   
 $= 2 \text{ AMPS} \times 10\Omega = 20 \text{ VOLT.}$

### EXAMPLE 3



FIND I  
FROM MAGIC CIRCLE

$I = \frac{E}{R} = \frac{12V}{6\Omega} = 2 \text{ AMPS}$

OHMS LAW

T5D07 D) WHAT IS THE CURRENT IN A CIRCUIT WITH AN APPLIED VOLTAGE OF 120 VOLTS AND A RESISTANCE OF 80 OHMS?



$$I = \frac{E}{R} = \frac{120}{80} = 1.5 \text{ AMPS}$$

T5D08 E) WHAT IS THE CURRENT THROUGH A 100-OHM RESISTOR CONNECTED ACROSS 200 VOLTS?

$$I = \frac{E}{R} = \frac{200V}{100\Omega} = 2 \text{ AMPS}$$

T5D09 F) WHAT IS THE CURRENT THROUGH A 24-OHM RESISTOR CONNECTED ACROSS 240 VOLTS?

$$I = \frac{E}{R} = \frac{240V}{24\Omega} = 10 \text{ AMPS}$$

T5D10 G) WHAT IS THE VOLTAGE ACROSS A 2 OHM RESISTOR IF A CURRENT OF 0.5 AMPERES FLOWS THROUGH IT?

$$E = I \times R = 0.5A \times 2\Omega = 1 \text{ VOLT}$$

T5D11 H) WHAT IS THE VOLTAGE ACROSS A 10 OHM RESISTOR IF A CURRENT OF 1 AMPERE FLOWS THROUGH IT?

$$E = I \times R = 1A \times 10\Omega = 10 \text{ VOLT}$$

T5D12 I) WHAT IS THE VOLTAGE ACROSS A 10 OHM RESISTOR IF A CURRENT OF 2 AMPERES FLOWS THROUGH IT?

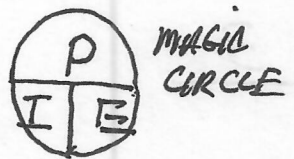
$$E = I \times R = 2A \times 10\Omega = 20V$$

POWER



T5C09 J) HOW MUCH POWER IS BEING USED IN A CIRCUIT WHEN THE APPLIED VOLTAGE IS 13.8V AND THE CURRENT IS 10 AMPERES?

$$P = I \times E = 10A \times 13.8V = 138W$$



POWER

T5C10 K) HOW MUCH POWER IS BEING USED IN A CIRCUIT WHEN THE APPLIED VOLTAGE IS 12 VOLTS DC AND THE CURRENT IS 2.5 AMPERES?

$$P = I \times E = 2.5A \times 12V = 30W$$

T5C11 L) HOW MANY AMPERES ARE FLOWING IN A CIRCUIT WHEN THE APPLIED VOLTAGE IS 12 VOLTS AND THE LOAD IS 120 WATTS?

SOLVE FOR I, FROM MAGIC CIRCLE

$$I = \frac{P}{E} = \frac{120W}{12V} = 10A$$

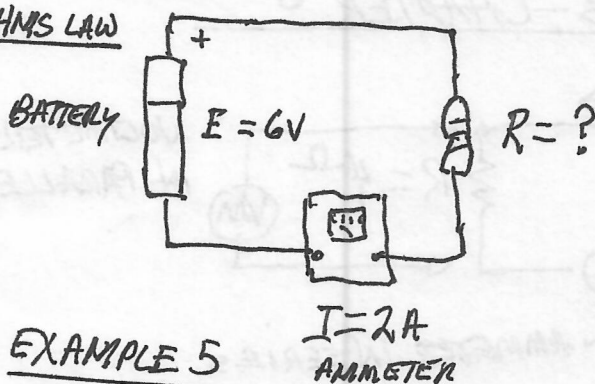
EXTRA BONUS M) WHAT IS THE VOLTAGE IF A 50WATT LOAD DRAWS 5 AMPERES?

SOLVE FOR E,

$$E = \frac{P}{I} = \frac{50W}{5A} = 10V$$

EXAMPLE 4

OHMS LAW



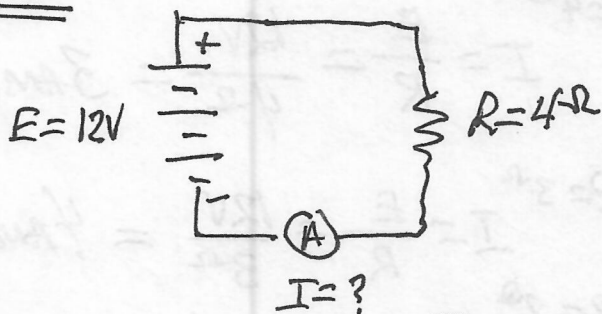
FIND R

FROM MAGIC CIRCLE

$$R = \frac{E}{I} = \frac{6V}{2A} = 3 \text{ OHMS}$$

EXAMPLE 5

POWER



FIND I

FROM MAGIC CIRCLE

$$I = \frac{E}{R} = \frac{12V}{4\Omega} = 3 \text{ AMPS}$$

FIND P

← FROM MAGIC CIRCLE FOR POWER

$$P = I \times E = 3 \text{ AMPS} \times 12 \text{ VOLTS} = 36 \text{ WATTS}$$



PROBLEMS

T5D04

A) WHAT IS THE RESISTANCE, R IN A CIRCUIT DRAWING 3 AMPS WHEN 90 VOLTS IS APPLIED?

OHMS LAW



$$R = \frac{E}{I} = \frac{90V}{3A} = 30 \text{ OHMS} = 30 \Omega$$

T5D05

B) WHAT IS THE RESISTANCE IN A CIRCUIT FOR WHICH THE APPLIED VOLTAGE IS 12 VOLTS AND THE CURRENT FLOW IS 1.5 AMPERES?

$$R = \frac{E}{I} = R = \frac{12V}{1.5A} = 8 \Omega$$

T5D06

C) WHAT IS THE RESISTANCE IN A CIRCUIT THAT DRAWS 4 AMPERES FROM A 12V SOURCE?

$$R = \frac{E}{I} = \frac{12V}{4A} = 3 \Omega$$