Assignment #4 Chapter 14

Electrical Engineering

$\frac{\quad}{20}$ = %

Due Date: Monday, November 4th, 2019

Name: Answers

1. In each of the appliances below, electrical energy is converted into another form of energy. What is the resulting form of energy? (3)

TABLE LAMP

luminous

FAN

mechanical

HEADAPHONES

sound

2. Anna is designing an electrical circuit. The components of the circuit are sensitive to power fluctuations, both high and low. (2)

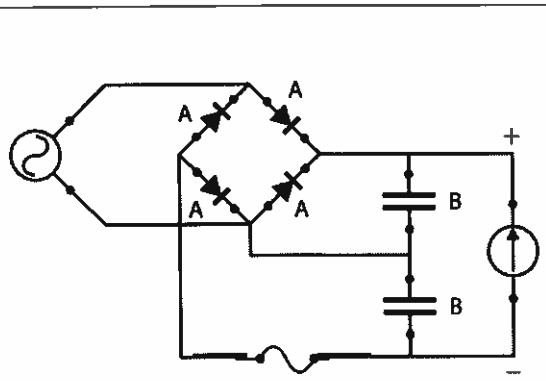
Which electrical component can she use to protect the circuit from such fluctuations? capacitor

Explain briefly how this component works:

A capacitor can store charge until it is needed.

3. The diagram below represents a "voltage doubler." For example, it can be used to increase voltage from 10 V to 20 V.
Identify all the components and state their function. (4)

Symbol	Component	Function
	AC	power supply
	DC	power supply
	diode	change AC to DC
	fuse	protection



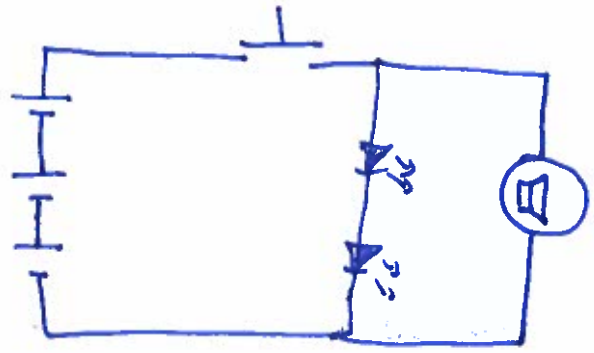
4. A company that manufactures resistors must verify 1 out of every 1 000 resistors for quality control. Using an accurate ohmmeter, the techinician measures the resistance, it is withing the acceptable range, production continues. If not, production muse stop immediately.
Suppose the technician obtains a reading of 492 750 Ω on the ohmmeter for a resistor whose value should be 47×10^4 ±5% Ω. What conclusion does the technician make? Show calculations & explain. (2)

470 000 ± 5%. range = (470 000 − 23500) to 470000 + 23500,
5% = 23506 446500 Ω to 493500

Yes, the resistor falls into the range. Production continues

5. Bayshore Shopping Center has a store called "Build-a-Bear Workshop". Children can choose a stuffed animal and which features it will have.

Draw a circuit diagram for a teddy bear that runs on 3 AAA batteries (1.5 V each), has 2 blue LEDs in his eyes that light up simultaneously, with a speaker that says "I love you". The toy is activated when the child presses the pushbutton switch in the teddy's paw. The circuit must be constructed in such a way that the teddy's eyes remain lit even if the speaker is broken. (4)

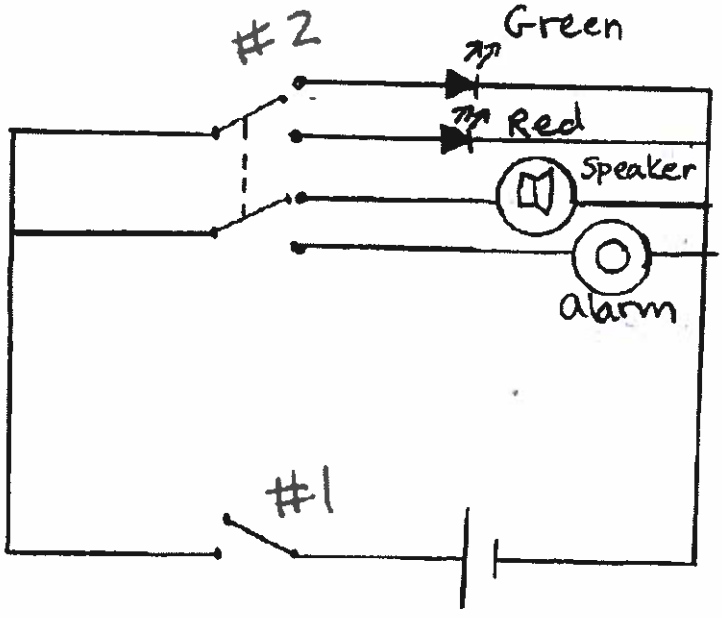


6. Study the circuit below to answer the following questions.

Identify the type of switches being used? (pole & throw) (2)

Switch #1: SPST Switch #2: DPDT

Explain how it works. (Explain which components work together and what role the different switches play in controlling the components.) (3)



Which components work together (at the same time)?

Green LED & speaker

Red LED & alarm

The role of switch #1 is to control:

the entire circuit (main power)

The role of switch #2 is to control:

the components.

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