# Ch14 Test Electrical Engineering

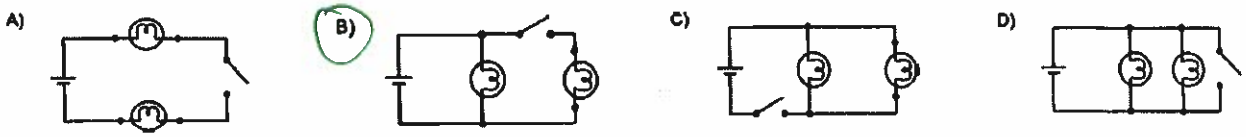
**Name:** Answers /40

1. Electronic devices use sensitive circuits that rely on components that can control current. Which of the following are **characteristics of electronic devices**?

   1. Mostly made of materials with strong conductors (such as copper).
   2. Mostly made with semiconductors (such as silicon). ✓
   3. Tend to use low-intensity current. ✓
   4. Can easily handle large motors requiring a lot of power.
   5. A kettle is an example.
   6. A calculator is an example. ✓

   A) 1,3,6 B) 1,4,5 C) 2,3,6 D) 2,4,5

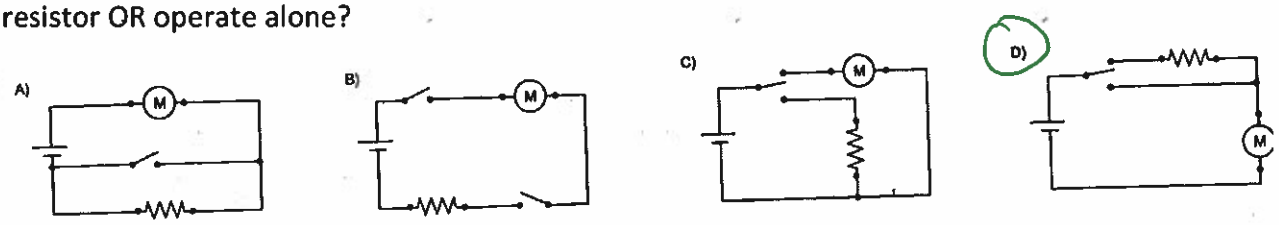
2. Which of the following diagrams correctly represents an electrical circuit with a switch that only allows one light bulb to be lit at a time?



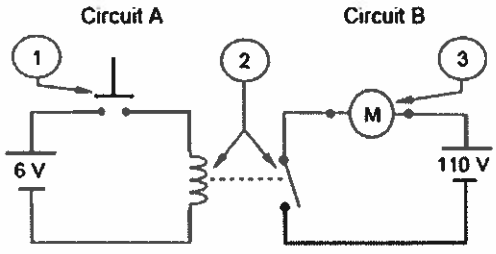

3. Which electrical component protects a circuit from spikes in electricity.

   A) a capacitor B) A diode C) A fuse D) A relay

4. Which of the following circuits allows the switch to allow the motor to operate in series with the resistor OR operate alone?




5. The diagram below shows two electrical circuits connected to each other.




Which of the following choices correctly matches each component with it's electrical function?

| | Component 1 | Component 2 | Component 3 |
|---|---|---|---|
| **A** | Controls circuit A ✓ | Controls circuit B ✓ | Transforms electical energy ✓ |
| **B** | Controls circuit B | Protects the motor | Transforms electical energy |
| **C** | Supplies circuit A with power | Stores electrical charges | Supplies circuit B with power |
| **D** | Controls circuit A ✓ | Stores electrical charges | Controls circuit B |

| Multiple Choice Answers | |
|---|---|
| 1 | C |
| 2 | B |
| 3 | C |
| 4 | D |
| 5 | A |

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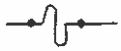
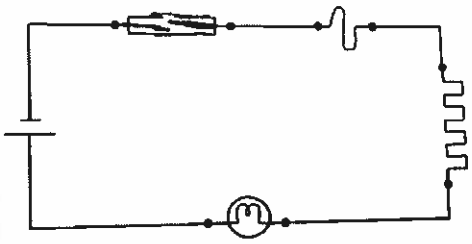
## Short Answer

6. For each item, indicate the type of energy being used and the type that is being created. (4)

| Item that performs an energy transformation | Type of energy used | Type of energy produced |
|---|---|---|
| Light Emitting Diode | Electrical | luminous |
| Solar panel | luminous | Electrical |
| Heater | Electrical | heat |
| Solenoid | Electrical | Magnetic force. |

7. Identify the symbol that matched the function: (4)

| Component | Symbol | Function |
|---|---|---|
| Switch |  | control |
| Fuse |  | protection |
| Heater |  | Energy Transformation |
| Light |  | E. Transformation |
| Battery |  | Power Supply. |



8. An electrical engineer must choose a power supply for various electrical materials.
What is the most suitable power source for each of the following projects? State why.
Your choices: Battery, solar panel, outlet. (3)

a) a communications tower to be built in the Far North of Québec, beyond access to the power grid:
Solar panel, no access to grid perhaps change batteries.

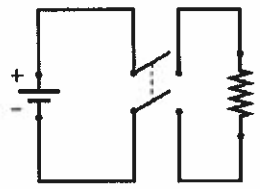
b) a digital camera: batteries portable

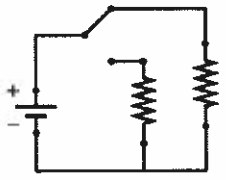
c) a photocopier: outlet needs a lot of energy.

9. Explain how a circuit breaker protects a circuit when the circuit is overloaded? (2)
When the current is too high. The bimetallic strip heats and bends breaking the current flow. This causes the breaker to switch to the off position.

10. What types of switches are represented in each of the diagrams below?(2)

A DPST B SPDT





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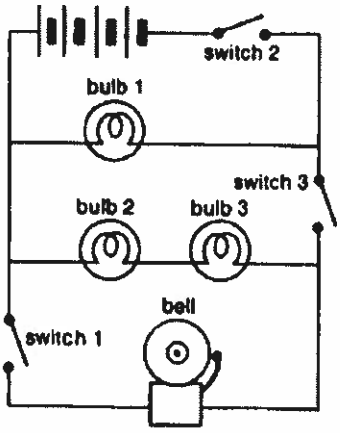
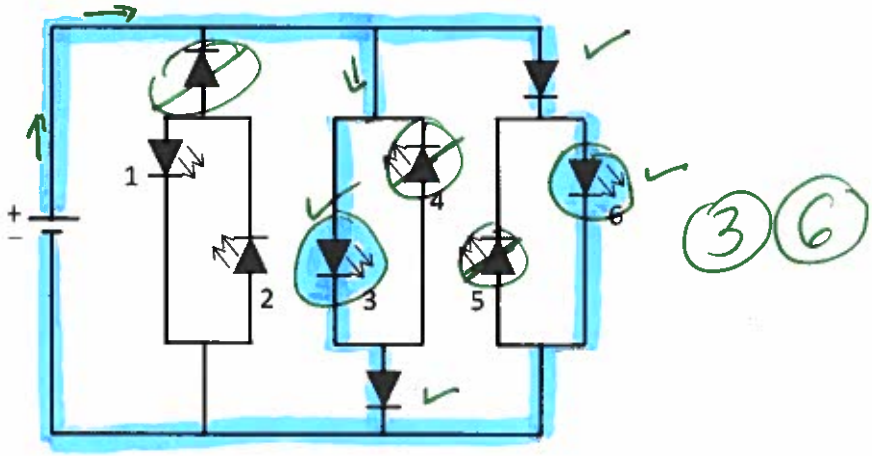
11. Use the diagram below to answer the following questions? (4)




a) Which bulb will be lit if switch 1 is closed? none
b) Which bulb will be lit if switch 2 is closed? 1
c) Which bulb will be lit if switch 2 & 3 are closed? 1, 2, 3 or all
d) Which switch(es) must be closed to allow the bell to ring? all 3

**Circuit Diagrams (11)**

12. Six branches of a parallel circuit are labeled 1 to 6 as shown below. Which LEDs will light up when the circuit is powered? (marks are deducted for extra lights as well) (2)

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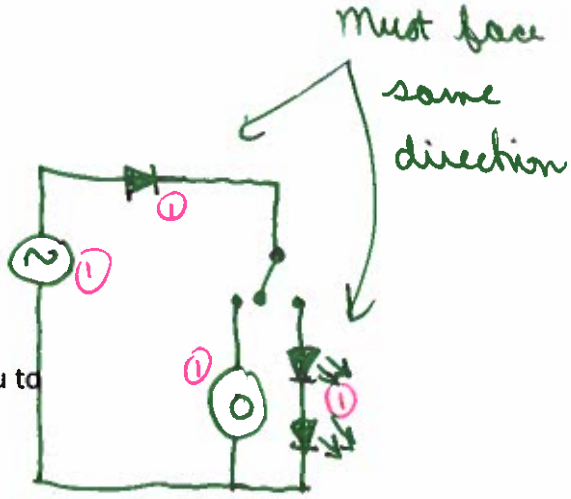
∅ electricity cannot pass as the diode is facing the wrong way.

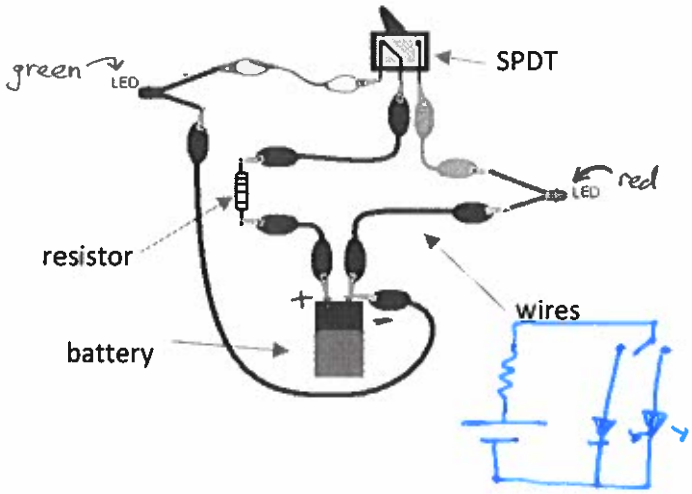
13. Draw the circuit diagram for the situation depicted below:

a) Draw a circuit diagram that uses: (4)

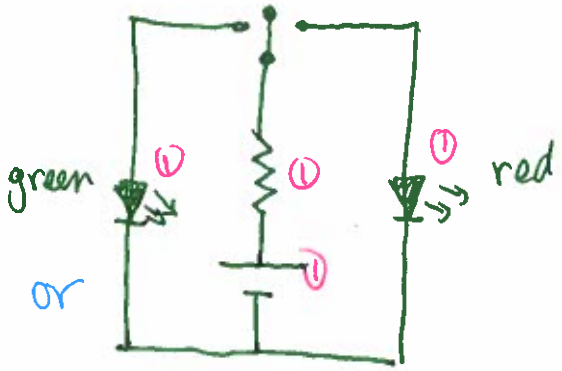
- **Alternating Current** as a power supply,
- a **diode,** to change the alternating to direct current,
- and a **single-pole double-throw switch** that allows you to choose between running a **buzzer** or **two LEDs.**




b) Draw a circuit diagram that best matches the picture below (5)




1 shape.

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