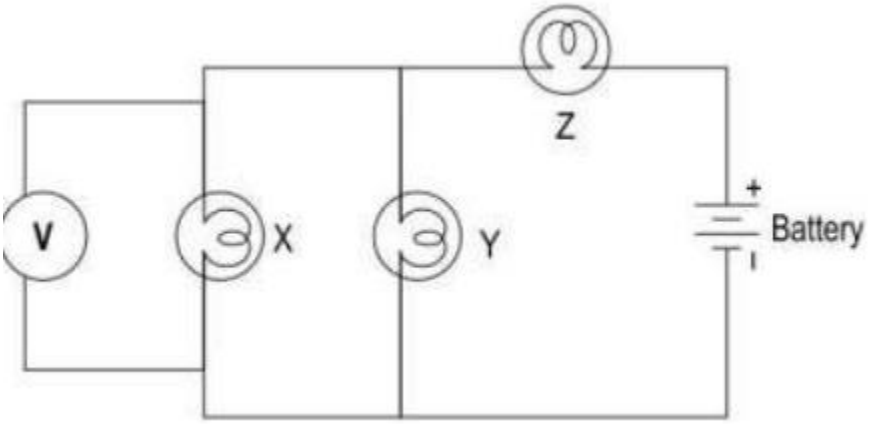
CBSE 10th Science

Chapter - 12 Magnetic Effects of Electric Current

Competency-Based Questions 2024-25

Q.1 The electric circuit below consists of a voltmeter, a battery and three bulbs X, Y and Z.

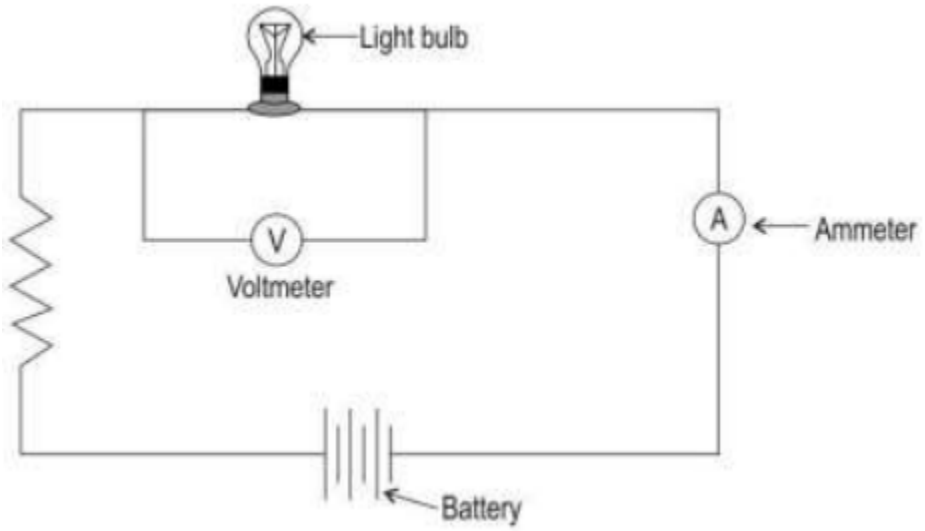


The reading on the voltmeter represents the potential difference across which bulb(s)?

A. Only X
B. Both X and Y
C. Both X and Z
D. All X, Y and Z

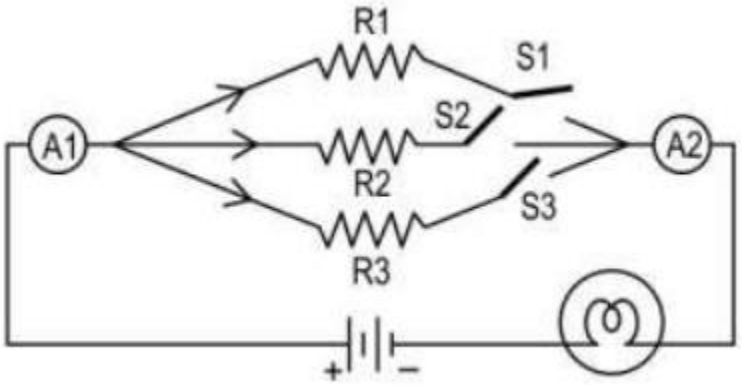
Answer. B. Both X and Y

Q.2 Of all the components in the circuit shown below, the current flowing through the voltmeter is the least. Explain why.



Answer. Of all the components, the voltmeter has the highest resistance.

Q.3 The circuit shown below has a bulb, three resistors R1, R2 and R3, and three switches S1, S2 and S3. There are also two ammeter A1 and A2 in the circuit.



How will the reading on ammeter A2 compare with the reading on ammeter A1 when

(i) All the three switches are closed?
(ii) One switch is closed?

Answer. The reading on ammeter A2 will be the same as the reading on ammeter A1.

The reading on ammeter A2 will be equal to the reading on ammeter A1.

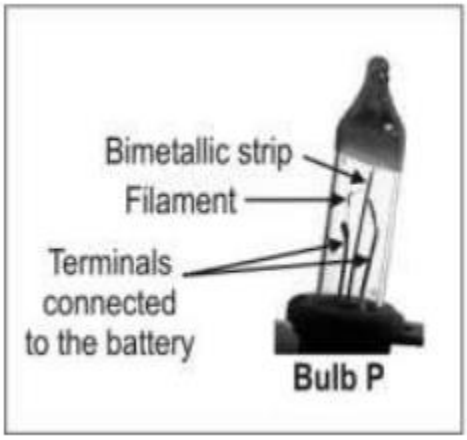
0.5 mark for each correct answer.

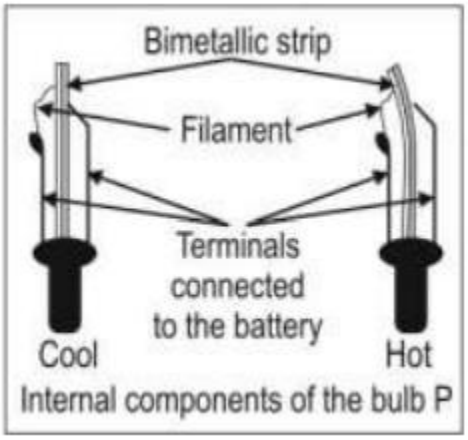
Q.4 Before cleaning the light bulb in hisroom, Gautam turned offthe light by turning the switch off. Yet, he received an electric shock while cleaning the bulb.

Explain why the bulb connection was live though the switch was off.

Answer. The switch was connected in the neutral wire instead of the live wire.

Q.5 The picture shown below is of a special bulb P which is used in some circuits of serieslights. Itsfilament isjoined to the two terminalsthrough a bimetallic strip, as shown. When the filament gets heated and glows, it also heats up the bimetallic strip which bends when heated.





Besides its function as a light bulb, which other component of a normal electric circuit is this bulb likely to function as? Justify your answer.

The bulb acts as a switch, shutting the lights off and on. [1 mark]

- On heating, the bimetallic strip expands and bends away from the terminal thus breaking contact with the terminal connected to the battery and thus breaking the circuit. [1 mark]

- On cooling, the bimetallic strip contracts and becomes straight again thus making contact once again with the terminal connected to the battery and switching on the lights. [1 mark]

Q.6 The picture below shows two diagrams of the wiring of an electric clothes iron. The thermostat is a device that can be set at a particular temperature, and controls the heating temperature of the iron by automatically shutting off and on. The indicator light is connected differently in the two diagrams.

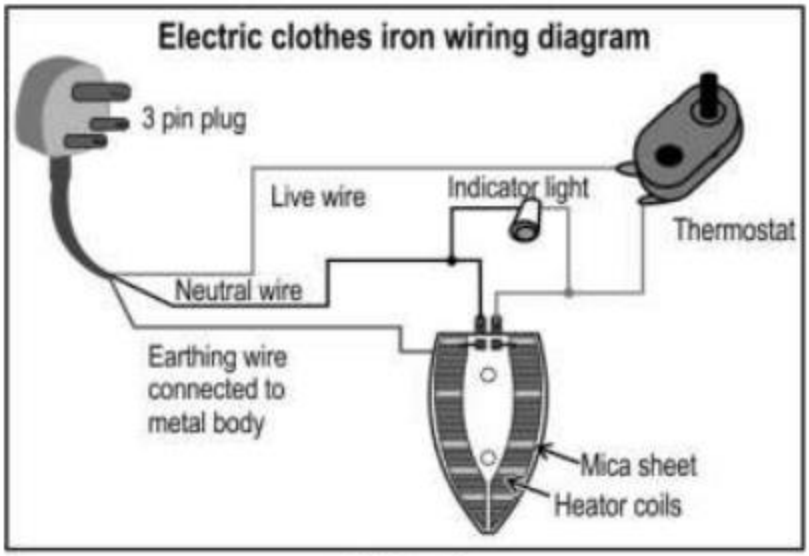


Figure 1

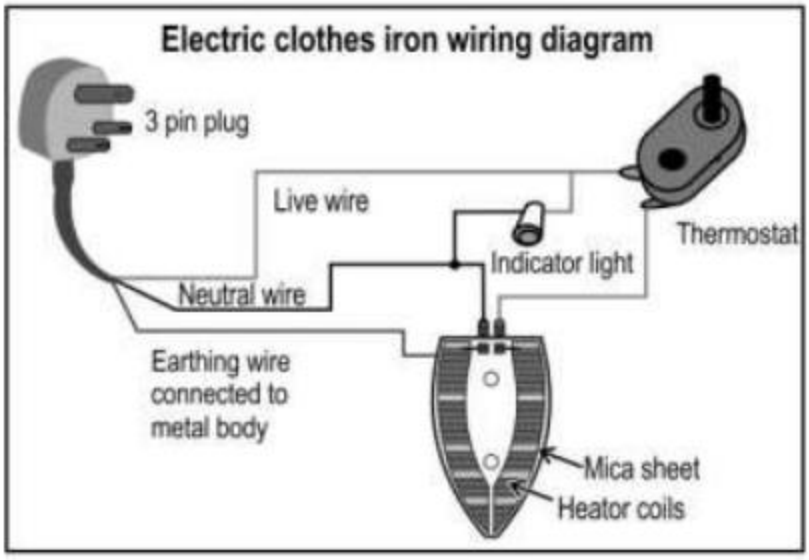


Figure 2

(a) Explain how the difference in the connections affects the functioning of the indicator light.

(b) Does this difference change the heating of the iron? Justify your answer.

(c) State the function of the earthing wire.

Answer. (a) 1 mark each for the following:

- In figure 1, the indicator light will go off and on as the thermostat controlling the heating of the coils cuts off and on.

- In figure 2, the indicator light will go off only when the main switch is put off.

(b) The difference in the connections will not change the heating of the iron as the thermostat will be controlling the heating of the coils by cutting off and on, though the light remains on continuously.

(c) The earthing wire protects against electric shocks.