

# Household Circuits

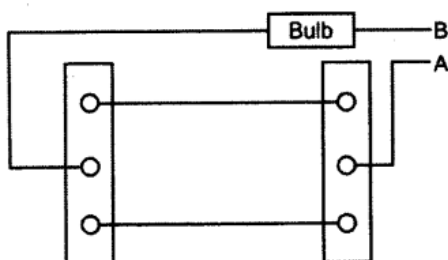
- Write one advantage of connecting electrical appliances in parallel combination
  - What characteristics should a fuse wire have?
  - Which wire in a power circuit is connected to the metallic body of the appliance?

(2019)

Answer:

- All appliances will continue to work even if one of the appliances does not work.
- High resistivity and low melting point.
- The ground wire.

- The diagram below shows a dual control switch circuit connected to a bulb.

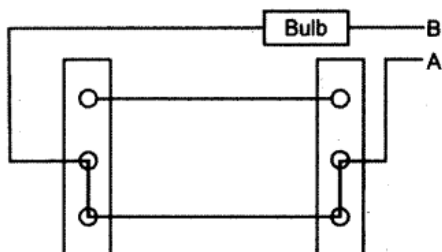


- Copy the diagram and complete it so that the bulb is switched ON.
- Out of A & B which one is the live wire and which one is the neutral wire?

(2019)

Answer:

- The diagram is as shown:



- A is connected to the live wire and B to neutral wire.

- Name the transformer used in the power transmitting station of a power plant.

- (ii) What type of current is transmitted from the power station ?
- (iii) At what voltage is this current available to our household ?

(2016)

Answer:

- (i) Step up transformer is used to step-up the generating power in a power plant.
- (ii) Alternating Current.
- (iii) 220 Volts.

4. (i) Name the device used to protect the electric circuits from overloading and short circuits.
- (ii) On what effect of electricity does the above device work ?

(2013)

Answer:

- (i) Electric fuse
- (ii) Heating effect of electrical current.

5. (i) An electrical gadget can give an electric shock to its user under certain circumstances. Mention any two of these circumstances.
- (ii) What preventive measure provided in a gadget can protect a person from an electric shock ?

(2013)

Answer:

- (i) (1) An electric shock may be caused either due to poor insulation of wires.
- (2) When the electric appliances are touched with wet hands.
- (ii) For prevention, the insulation of wires must be of good quality and it should be checked from time to time particularly when they become old, so that no wire is left naked.

6. An electrical appliance is rated at 1000 KVA, 220V. If the appliance is operated for 2 hours, calculate the energy consumed by the appliance in :
- (i) kWh      (ii) joule

(2012)

Answer:

- (i) Let Energy consumed = Power  $\times$  Time
- $= 1000 \times 2$
- $= 2000 \text{ kWh}$

(ii) Since  $1 \text{ kWh} = 3.6 \times 10^6 \text{ J}$   
 Energy consumed =  $2000 \times 3.6 \times 10^6 \text{ J}$   
 $= 7.2 \times 10^9 \text{ J}.$

7. (i) Write an expression for the electrical energy spent in the flow of current through an electrical appliance in terms of I, R and t.  
 (ii) At what voltage is the alternating current supplied to our houses ?  
 (iii) How should the electric lamps in a building be connected ?

(2012)

Answer:

- (i) We know that  $E = VIt = I^2Rt.$   
 (ii) 220V – 240V  
 (iii) In a building, Electric lamps are connected in parallel.

8. Two bulbs are marked 100 W, 220 V and 60 W, 110 V. Calculate the ratio of their resistances.

(2011)

Answer:

$$\therefore R = \frac{V^2}{P}$$

$$\Rightarrow R_1 = \frac{(220)^2}{100} \text{ and } R_2 = \frac{(110)^2}{60}$$

$$\frac{R_1}{R_2} = \frac{220 \times 220 \times 60}{100 \times 110 \times 110}$$

$$= \frac{12}{5}$$

9. What is the color code for the insulation on the earth wire ?

(2011)

Answer:

Green at Yellow

10. Write an expression for calculating electrical power in terms of current and resistance.

(2011)

Answer:

$$P = VI = (IR) I \quad (\because \text{By Ohm's Law, } V = IR)$$

$$P = I^2R$$

11. (i) Name two safety devices which are connected to the live wire of a household electrical circuit.

(ii) Give one important function of each of these two devices. **[4]**

(2011)

Answer:

(i) (1) Fuse and (2) Switch.

(ii) Fuse is used to limit the flow of current. Switch is used to start or stop the flow of current.

12. (i) In what unit does the domestic electric meter measure the electrical energy consumed ? State the value of this unit in S.I.

(ii) Why should switches always be connected to the live wire ?

(iii) Give one precaution that should be taken while handling switches. **[4]**

(2010)

Answer:

(i) kWh

$$1 \text{ kWh} = 3.6 \times 10^6 \text{ J.}$$

(ii) Because current is brought to the appliance through the live wires.

(iii) Switches should not be touched with wet hands.

13. Give two differences between a d.c. motor and an a.c. generator.

(2010)

Answer:

D.C. Motor	A.C. Generator
(i) It converts electrical energy into mechanical energy	(i) It converts mechanical energy into electrical energy
(ii) it consists of split rings	(ii) it consists of slip rings