Assignment (Current Electricity)
(Class 9)

1. Name a device that helps to maintain a constant potential difference across a conductor.

2. Define 1 volt. Express it in terms of SI unit of work and charge calculate the amount of energy consumed in carrying a charge of 1 coulomb through a battery of 3 V.

3. How is an ammeter connected in a circuit to measure current flowing through it?

4. What happens to resistance of a conductor when its area of cross-section is increased?

5. Calculate the charge passing through an electric bulb in 20 minutes if the value of current is 200 mA.

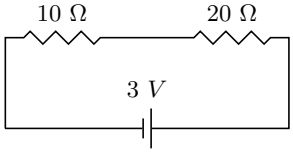
6. A 9 Ω resistance is cut into three equal parts and connected in parallel. Find the equivalent resistance of the combination.

7. What is meant by electric current? Name and define its SI unit. In a conductor electrons are flowing from B to A. What is the direction of conventional current? Give justification for your answer. A steady current of 1 ampere flows through a conductor. Calculate the number of electrons that flows through any section of the conductor in 1 second. (Charge on electron 1.6×10^{-19} coulomb).

8. What is meant by electrical resistivity of a material? Derive its S.I. unit.

9. State Ohm's law. Write the necessary conditions for its validity. How is this law verified experimentally? What will be the nature of graph between potential difference and current for a conductor? Name the physical quantity that can be obtained from this graph.

10. Study the following electric circuit and find (*i*) the current flowing in the circuit and (*ii*) the potential difference across 10 Ω resistor.

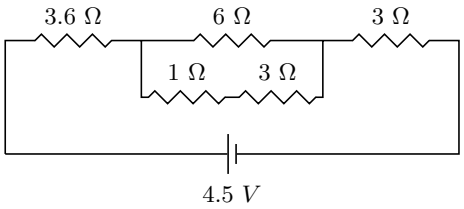


11. (*i*) Define electric power. Express it in terms of potential difference V and resistance R. (*ii*) An electrical fuse is rated at 2 A. What is meant by this statement? (*iii*) An electric iron of 1 kW is operated at 220 V. Find which of the following fuses that are rated at 1 A, 3 A and 5 A can be used in it.

12. Write relation between heat energy produced in a conductor when a potential difference V is applied across its terminals and a current I flows through for time duration t.

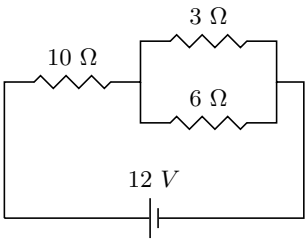
13. State the difference between the wire used in the element of an electric heater and in a fuse wire.

14. Find the current flowing through the battery in the following electric circuit.

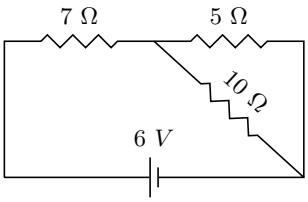


15. An electric bulb of resistance 200 Ω draws a current of 1 A. Calculate the power of the bulb, the potential difference across its ends and the energy in kWh required to operate it for 5 h.

16. Consider the circuit shown in the diagram. Find the current in the 3 Ω resistor.



17. Consider the circuit shown in the diagram.



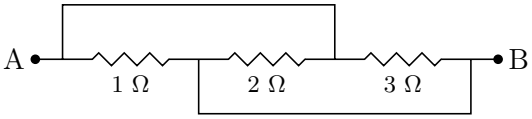
Determine (*i*) the equivalent resistance across the terminals of the battery, (*ii*) the current through the battery, (*iii*) the voltage across the 7 Ω resistance.

18. The length of a cylindrical wire is increased 100 % keeping the volume and the shape unchanged. Then the percentage change in the resistance of the conductor will be

(A) 50% (B) 200%

(C) 100% (D) 300%

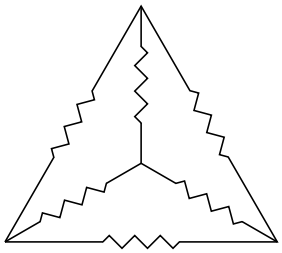
19. The equivalent resistance across A and B in the following circuit will be



(A) 6Ω (B) 11/6Ω

(C) 6/11Ω (D) 5Ω

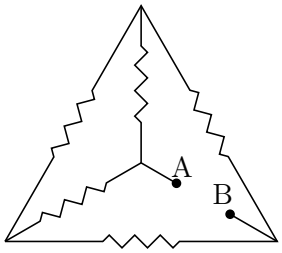
20. In the network shown, each resistor is of 10 Ω. Then the equivalent resistance between any two vertices is



(A) 60 Ω (B) 30 Ω

(C) 20 Ω (D) 5 Ω

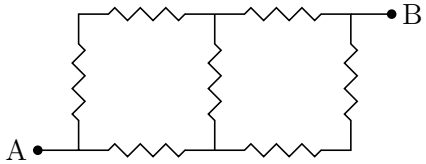
21. In the network shown, each resistor has a resistance R. Then the equivalent resistance between A and B is



(A) $R/2$ (B) $2R$

(C) R (D) $3R/2$

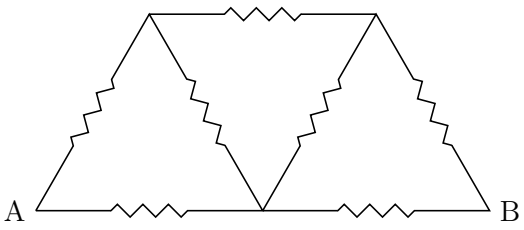
22. In the network shown, each resistor has a resistance 10 Ω. Then the equivalent resistance between A and B is



(A) 70 Ω (B) 10 Ω

(C) 50 Ω (D) 14 Ω

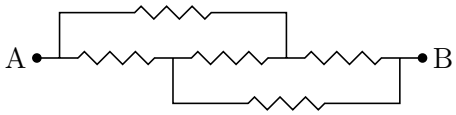
23. In the network shown, each resistor has a resistance R. Then the equivalent resistance between A and B is



(A) $4R/3$ (B) $7R$

(C) $3R/2$ (D) $8R/7$

24. Five resistors, each having a resistance of 5 Ω, are connected as shown below.

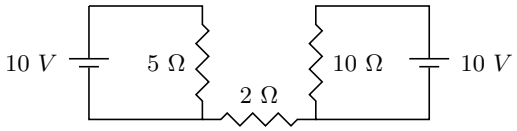


The equivalent resistance across A and B in the following circuit will be

(A) 25 Ω (B) 5 Ω

(C) 15 Ω (D) 2/3 Ω

25. For the circuit shown, the current through 2 Ω resistance is



(A) 0 (B) 2 A

(C) 1 A (D) 3 A

26. Using the resistors R_1 and R_2 singly, in series and in parallel combination, we can get 4, 5, 20 and 25 Ω (not necessarily in the above specified order). Then R_1, R_2 (in Ω) are, respectively,

(A) 4, 5 (B) 5, 20

(C) 20, 25 (D) 25, 4

27. A piece of copper wire is cut in ten equal parts. These parts are connected in parallel. The equivalent resistance of the parallel combination will be equal to the original resistance of the uncut wire, multiplied by

(A) 1 (B) 10

(C) 0.1 (D) 0.01

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