

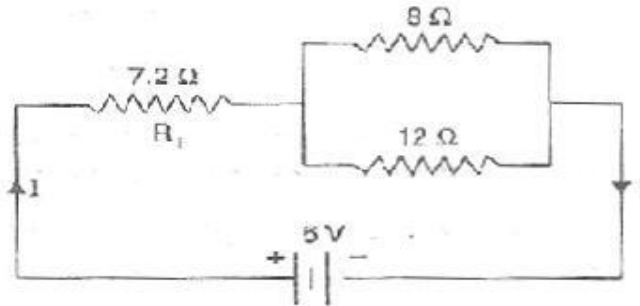
NUMERICALS
Electricity & its effects

2. Calculate the number of electrons constituting one coulomb of charge per second through any cross section of a conductor.
3. How much work is done in moving a charge of 2 C across two points having a potential difference of 12 V ?
4. How much energy is given to each coulomb of charge passing through a 6 V battery ?
5. Calculate the work done in moving a charge of 5 Coulombs from a point at a potential of 210 Volts to another point at 240 Volts.
7. When a particle of charge $10 \mu\text{C}$ is brought from infinity to a point P, 2.0 mJ work is done by the external forces. What is the potential at P?
9. How many electrons pass through a lamp in one minute if the current be 200 mA?
10. Calculate the current supplied by a cell if the amount of charge passing through the cell in 4 seconds is 12 C ?
11. A 2 Volt cell is connected to a 1Ω resistor. How many electrons come out of the negative terminal of the cell in 2 minutes ?
12. a) How much current will an electric bulb draw from a 220 V source, if the resistance of the bulb filament is 1200Ω ?
b) How much current will an electric heater coil draw from a 220 V source, if the resistance of the heater coil is 100Ω ?
13. The potential difference between the terminals of an electric heater is 60 Volts when it draws a current of 4 Ampere from a source. What current will the heater draw if the potential difference is increased to 120 Volt.
14. A torch bulb when cold has 1Ω resistance. It draws a current of 0.3 Ampere when glowing from a source of 3 V. Calculate the resistance of the bulb when glowing and explain the reason for the difference in resistance.
15. A current of 0.2 Ampere flows through a conductor of resistance 4.5Ω . Calculate the potential difference at the ends of the conductor.
16. A resistance of 6 ohms is connected in series with another resistance of 4 ohms. A potential difference of 20 volts is applied across the combination. Calculate the current through the circuit and potential difference across the 6 ohm resistance.
17. Resistors R₁, R₂, R₃ having values 5Ω , 10Ω , 30Ω respectively are connected in parallel across a battery of 12 Volts. Calculate

- (i) Current through each resistor .
- (ii) Total current.
- (iii) Total resistance.

18. In the circuit diagram below, find

- (i) total resistance of the circuit
- (ii) total current flowing in the circuit.
- (iii) Potential difference across R₁. [C.B.S.E. 1990, 1993]



19. An electric lamp of $100\ \Omega$, a toaster of resistance $50\ \Omega$, and a water filter of resistance $500\ \Omega$ are connected in parallel to a 220 Volt source. What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances, and what is the current through it ?

20. How can three resistances of $2\ \Omega$, $3\ \Omega$ & $6\ \Omega$ be connected to give the total resistance of
 a) $4\ \Omega$ b) $1\ \Omega$

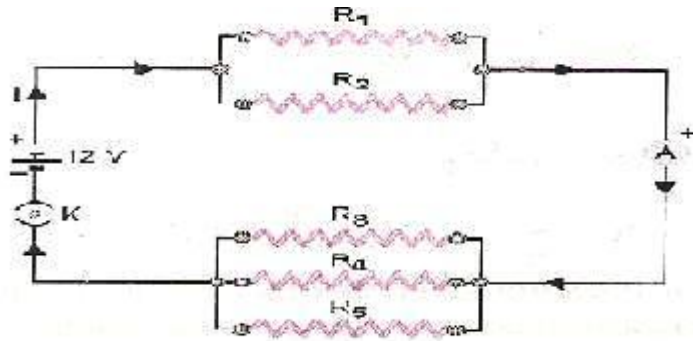
21. An electric lamp, whose resistance is $20\ \Omega$, and a conductor of $4\ \Omega$ resistance are connected to a 6 V battery . Calculate
 (a) The total resistance of the circuit,
 (b) The current through the circuit, and
 (c) The potential difference across the electric lamp and conductor.

22. a) Draw a schematic diagram of a circuit consisting of a battery of three cells of 2 V each, a $5\ \Omega$ resistor, an $8\ \Omega$ resistor, and a $12\ \Omega$ resistor, and a plug key, all connected in series.

b) Redraw the circuit of above, putting in an ammeter to measure the current through the resistors and a voltmeter to measure the potential difference across the $12\ \Omega$ resistor. What would be the readings in the ammeter and the voltmeter?

23. In the given Figure $R_1 = 10\ \Omega$, $R_2 = 40\ \Omega$, $R_3 = 30\ \Omega$, $R_4 = 20\ \Omega$, $R_5 = 60\ \Omega$, and a 12 V battery is connected to the arrangement. Calculate

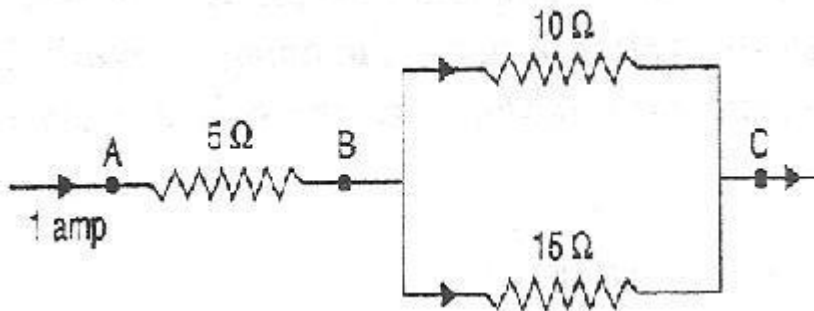
- (a) The total resistance in the circuit.
- (b) The total current flowing in the circuit.



24. Judge the equivalent resistance when the following are connected in parallel –
 (a) $1\ \Omega$ and $106\ \Omega$ (b) $1\ \Omega$ and $103\ \Omega$, and $106\ \Omega$.

25. What is (a) the highest, (b) the lowest total resistance that can be secured by combinations of four coils of resistance $4\ \Omega$, $8\ \Omega$, $12\ \Omega$, $24\ \Omega$?

26. In the circuit diagram below the current through $5\ \Omega$ resistance is 1A . Find
 (i) Current through the other two resistors?
 (ii) What is the potential difference across AB and across AC?
 (iii) What is the total resistance? [2003]

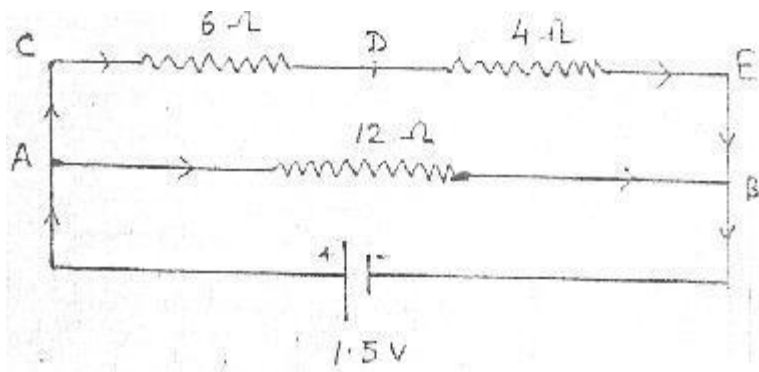


27. A piece of wire having a resistance R is cut into four equal parts.
 (i) How will the resistance of each part of the wire compare with the original resistance?

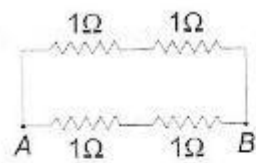
(ii) If the four parts of the wire are placed in parallel, how will the resistance of the combination compare with the resistance of the original wire?

28. When two resistances R_1 & R_2 are connected in parallel, the net resistance is $3\ \Omega$. When connected in series, its value is $16\ \Omega$. Calculate the value of R_1 & R_2 . [2002]

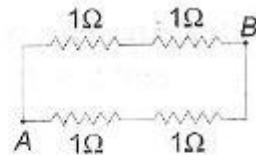
29. In the circuit shown below, calculate
 (i) Current flowing through arms AB, AC and CDE.
 (ii) Potential difference across AB, CD and DE.



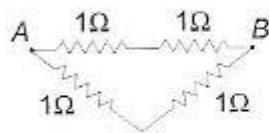
30. Find the equivalent resistance between points A and B.



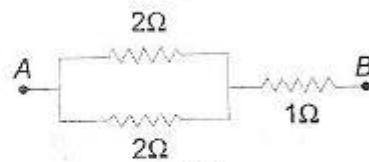
(a)



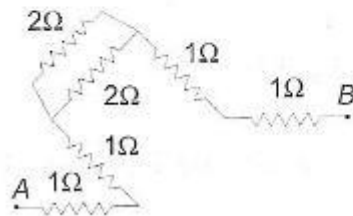
(b)



(c)



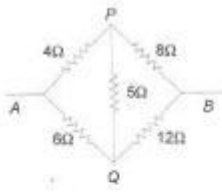
(d)



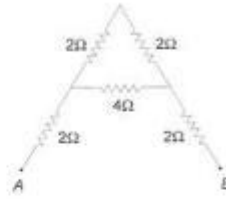
(e)

31. Find the equivalent resistance between points A and B.

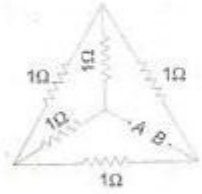
a)



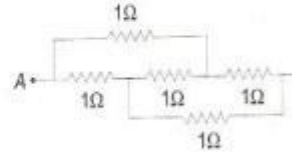
b)



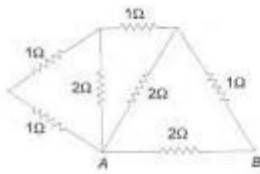
c)



d)



e)



f)

