DPP – 1 Electricity

1. A charge of 1000 C flows through a conductor for 3 min and 20 s. Find the magnitude of current flowing through conductor.
2. A charge of 5000 C flows through an electric in 2 hours and 30 minutes. Calculate the magnitude of the current in circuit.
3. A charge of 8860 C flows through an electric circuit in 2 min and 40 s. Find the magnitude of current flowing through conductor.
4. A dry cell can supply a charge of 50 C. If the current drawn from the cell is 750 μA, find the time in which the cell completely discharges.
5. A battery can supply a charge of 25×10^4 C. if the current is drawn from battery at the rate of 2.5 A, calculate the time in which battery will discharge completely.
6. A dry cell can supply a charge of 800 C. If continuous current of 8.0 mA is drawn, calculate the time in which cell will discharge completely.
7. A charge of 50 mA flows for 0.5 hrs through an electric circuit. Calculate the number of electrons which will drift in the circuit. [Charge on one electron 1.6×10^{-19} C]
8. Calculate the total number of electrons flowing through a circuit in 20 mins and 40 s,if a current of 40 μA flows through the circuit.
9. 4×10^{20} electrons flow through a circuit in 10 hours. Calculate magnitude of current.
10. A charge of 1000 C flows through a conductor for 3 min and 20 s. Find the magnitude of current flowing through the conductor.
11. A charge of 5000 C flows through an electric circuit in 2 hours and 30 minutes. Calculate the magnitude of current in the circuit.
12. A charge of 8860 C flows through an electric circuit in 2 min. and 40 s. Calculate the magnitude of current in the circuit.
13. Define quantity of charge. States its practical unit and define it.
14. In which direction conventional current and electronic current flow from a source of electricity?
15. Define electric current. State its practical unit and define it.
16. Define electric potential. State its practical unit and define it.
17. Define (i) open electric circuit, (ii) closed electric circuit.
18. State two multiples and two submultiples of the unit of electric potential and electric current.
19. What do you understand by the terms potential difference? State its practical unit.

DPP – 2 Electricity

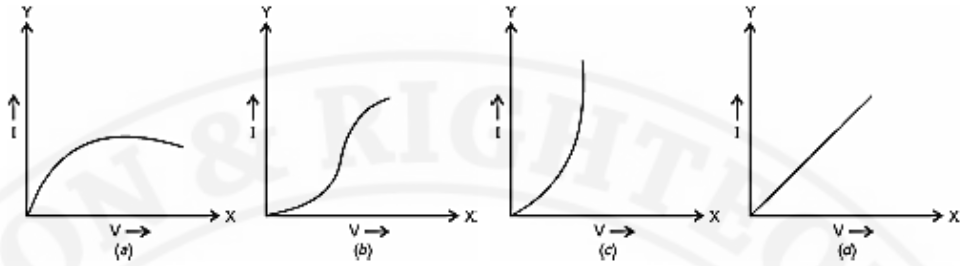
1. What do you understand by the term electric resistance? State its practical unit.
2. What do you understand by the term electric conductance? State its practical unit.
3. What is a superconductor? Name two materials and the temperature at which they become superconductors.
4. State the laws of resistance.
5. Define specific resistance and state its unit in CGS and SI system.
6. Name two materials in each case whose resistance (1) increases, (ii) remains the same and (iii) decreases with the rise in temperature.
7. Give two differences between the electric resistance and electric specific resistance of a material.
8. The graph between V/I for a conductor is a straight line. The slope of the graph represents:
   (a) resistivity **(c)** electric potential
   (b) resistance **(d)** None of these
9. Two conductors A and B have 500 and 100 units of negative charge when the conductors are connected by an electric wire the conventional current flows from:
   (a) A to B **(c)** current does not flow
   (b) B to A **(d)** None of these
10. A conductor at 4.2 K is found to offer no resistance. Such a conductor is called
    (a) zero conductor **(c)** absolute conductor
    (b) superconductor **(d)** none of these
11. Which of the following is non-ohmic resistance?
    (a) Copper wire **(c)** Electromagnet
    (b) Brass wire **(d)** Constantan wire
12. Which of the following an ohmic resistance?
    (a) Diode valve **(c)** Carbon
    (b) Filament of a bulb **(d)** Manganin wire
13. A conductor has a resistivity of 2.63×10^{-8} Ω m at 20°C. If the temperature of conductor is raised to 200°C, its resistivity will:
    (a) increase **(c)** remain unaffected
    (b) decrease **(d)** none of these
14. Amongst the following substance, the resistance will decrease with the increase in temperature in case of:
    (a) copper **(c)** brass
    (b) carbon **(d)** nichrome

DPP – 3 Electricity

1. The resistance of a wire of length 100 cm and of uniform area of cross-section 0.020 cm^2, is found to be 2.0 ohm. Calculate the sp. resistance of the wire.
2. A nichrome wire has a resistance of 10 Ω. Find the resistance of another nichrome wire, whose length is three times and area of cross-section is four times the first wire.
3. A resistance wire made from German silver has a resistance of 4.25 Ω. Calculate the resistance of another wire, made from the same material, such that its length increases by 4 times and area of cross-section decreases by three times.
4. A mchrome wire of length *l* and area of cross-section a/4 has a resistance R. Another nichrome wire of length 3*l* and area of cross-section a/2 has a resistance of R_1. Find the ratio of R_1: R.
5. A wire of resistance 4.5 Ω and length 150 cm has an area of cross-section of 0.04 cm^2. Calculate the sp. resistance of the wire.
6. A wire of length 40 cm and area of cross-section 0.1mm^2 has a resistance of 0.8 Ω. Calculate the sp. resistance of the wire.
7. What should be the length of nichrome wire of resistance 5.6 Ω, if the length of a similar wire is 80 cm and its resistance is 4.2 Ω?
8. Resistance of a conductor of length 75 cm is 3.25 Ω. Calculate the length of a similar conductor, whose resistance is 13.25 Ω.
9. A conductor of length 85 cm has a resistance of 3.75 Ω. Calculate the resistance of a similar conductor of length 540 cm.
10. A metallic wire has a resistance of 2 ohms per metre. Find the total resistance of two lengths of this wire, each 1.5 m long and connected in parallel. What will be the resistance of 4 m of a wire of same material, but twice the area of cross-section?

DPP – 4 Electricity

1. Figures (a), (b), (c) and (d) below shows I–V characteristic curves for same resistors. Identify the ohmic and non-ohmic resistors and give a reason for your answer.



2. Write an expression connecting the resistance and resistivity. State the meaning of symbols used.

3. State the order of resistivity of : (i) metals, (ii) semi-conductors and (iii) insulators.

4. Two wires of same material and same length have radii r_1 and r_2 respectively. Compare their (a) resistances, (b) resistivities.

5. A given wire is stretched to double its length. How will its resistance change? Give a reason for your answer.

6. Name the material used for making the connection wires. Give a reason for your answer.

7. Name the material used for making standard resistors. Give a reason for your answer.

8. What is a super conductor? Give two examples.

9. What do you understand by the term internal resistance of cell?

10. How is internal resistance of cell affected with change in

- **(a)** surface area of electrodes in contact with electrolyte?
- **(b)** distance between the electrodes?
- **(c)** concentration of electrolyte?
- **(d)** temperature of electrolyte?

11. Explain the meaning of terms e.m.f. and terminal voltage of a cell.

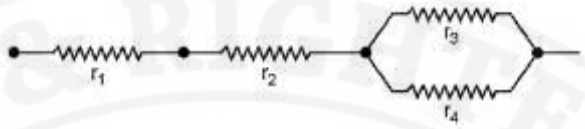
12. A high resistance voltmeter is connected in parallel to the terminals of cell which shows emf E. The cell is connected to an external circuit through a switch and rheostat. When the current in the external circuit is gradually increased, the reading of voltmeter drops. Explain.

13. Differentiate between e.m.f. and terminal voltage of a cell.

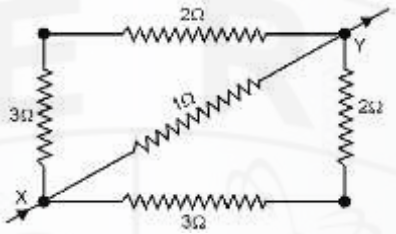
DPP – 5 Electricity

1. Three resistors of 6 Ω, 3 Ω. and 2 Ω are connected together, such that their total resistance is greater than 6 Ω, but less than 8 Ω. Draw a diagram to show this arrangement and calculate total resistance.

2. Calculate the equivalent resistance of resistors r_1; r_2; r_3 and r_4.



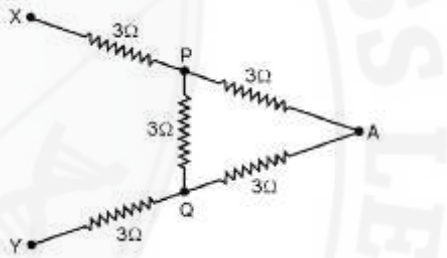
3. Diagram below shows a network of five resistances. Calculate the resistance between points X and Y.



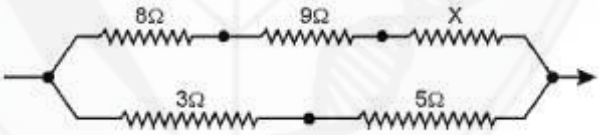
4. The diagram shows resistors of 3Ω, in a network. Calculate the equivalent resistance:

(a) Between points P and Q.

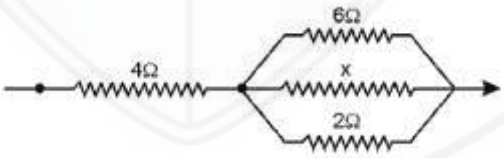
(b) Between points X and Y.



5. Equivalent resistance of circuit diagram is 6 Ω. Calculate the value of x.



6. Equivalent resistance of circuit diagram is 5Ω. Calculate the value of x.



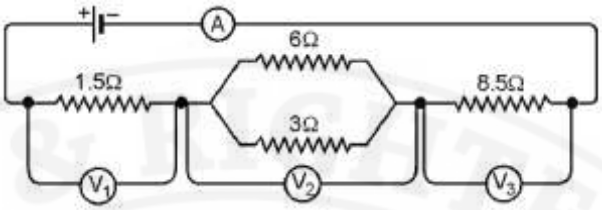
7. A current of 0.2 A flows through a conductor of resistance 4.5 Ω. Calculate the p.d. at the ends of conductor.

8. A bulb of resistance 400 Ω is connected to 200 V mains. Calculate the magnitude of current.

9. An electric heater draws a current of 5 A, when connected to 220 V mains. Calculate the resistance of its filament.

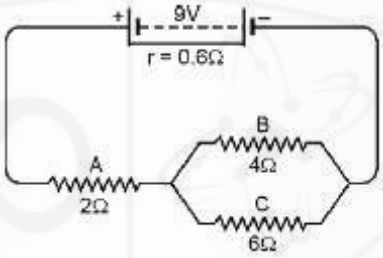
DPP – 6 Electricity

1. The figure below, shows a circuit diagram having a battery of 24 V and negligible internal resistance. Calculate: (i) Reading of ammeter, (ii) Reading recorded by V_1; V_2 and V_3.



2. Two cells, each having e.m.f of 2 V and internal resistance 1.5 Ω are connected in parallel. The arrangement is then connected to 4.25 Ω resistor. Calculate the current flowing through 4.25 Ω resistor.

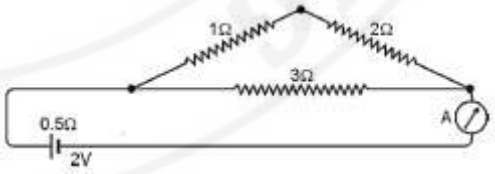
3. Figure given below shows a circuit diagram, having a battery of 9 V and internal resistance 0.6 Ω connected to three resistors A, B and C. Calculate the current in each resistor.



4. Four cells each of e.m.f. 2V and internal resistance 0.1 Ω are connected in series. The combination in series is connected to an ammeter of negligible resistance, 1.6 Ω resistor and an unknown resistor R_1. The current in the circuit is 2A. Draw a labelled circuit diagram for the above arrangement and calculate: (i) Total resistance in the circuit, (ii) Total e.m.f., (iii) Value of R_1, (iv) p.d. across R_1.

5. A cell of e.m.f. 1.5 V and internal resistance 0.3 Ω is connected to a set of two resistances of 2 Ω and 3 Ω in parallel. Draw a labelled circuit diagram, showing the above arrangement, and calculate the current drawn from the cell.

6. Figure below is a circuit diagram in which three resistors of 1Ω, 2Ω and 3Ω are connected to a cell of e.m.f. 2V and internal resistance 0.5. Ω



(a) Calculate the total resistance of the circuit.

(b) What is the reading of the ammeter?

(c) What will be the reading of ammeter, if an exactly similar cell is connected in series, with the given cell?

7. Four cells, each of e.m.f. 2V and internal resistance 0.2 Ω are connected in series to form a battery. The battery is connected to an ammeter, a resistance of 1.2 Ω and a set of three resistances of 4 Ω; 6 Ω and 12 Ω in parallel, so as to complete an overall circuit in series.

(a) Draw the circuit diagram of the arrangement.

(b) Calculate current recorded by ammeter.

(c) Calculate current flowing in 6 Ω wire

(d) Calculate p.d. across 1.2 Ω wire

(e) Calculate drop in potential across the terminals of battery.

8. Two cells, each of e.m.f. 1.5V and internal resistance 1 Ω are connected in parallel to form a battery. The battery is connected to an external resistance of 0.5 Ω and two resistances of 3 Ω and 1.5 Ω in parallel.

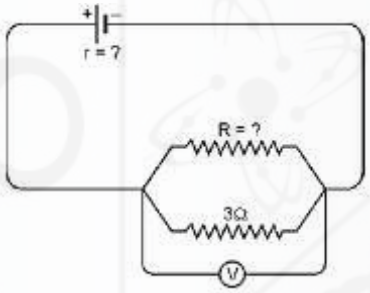
(a) Draw the circuit diagram

(b) Calculate the current in main circuit

(c) Calculate the current in 1.5Ω resistor

(d) Calculate the drop in potential across the terminals of battery.

9. The given figure is a circuit diagram, such that a current of 1A flows through the circuit, when p.d. recorded at the ends of parallel resistors is 1.0 V. Calculate the values of R and r.



10. A cell of e.m.f. 1.8 V is connected to an external resistance of 2 Ω when p.d. recorded at the ends of resistance is 1.6 V. Calculate the internal resistance of cell.

11. A cell when connected to an external resistance of 4.5 Ω, shows a p.d. of 1.35 V. If 4.5 Ω resistance is replaced by 2.5 Ω resistance, the p.d. drops to 1.25 V. Calculate the value of e.m.f. and internal resistance of the cell.

DPP – 7 Electricity

1. What do you understand by the term electric work?
2. State the SI unit of electric work and define it.
3. Name two bigger units of electric work. How are these units related to the SI unit of electric work?
4. State expressions for electric work connecting:
    a. Current, resistance and time.
    b. Current, potential difference and time.
    c. Potential difference, resistance and time.
5. State three factors which determine the quantity of heat produced in a conductor.
6. Can heat produced in a conductor be called a measure of electric work ? If so, give a reason in support of your answer.
7. What do you understand by the term electric power? State the SI unit of electric power and define it.
8. Name two bigger units of electric power. How are these units related to the S.I units of electric power?
9. State expression for electric power connecting
    a. Current and resistance.
    b. Current and potential difference.
    c. Resistance and potential difference.
10. Name and define the smallest commercial unit of electric energy.
11. Name and define the standard commercial unit of electric energy.
12. How many joules of energy are there in one kilowatt hour?
13. Distinguish between kilowatt and kilowatt hour.
14. What do the following units measure ?
    a. coulomb,
    b. kilowatt hour.
15. Explain the meaning of statement “the power of an appliance is 100 W.”

DPP – 8 Electricity

1. Calculate the energy released by a heater, which draws a current of 5 A at 220 V for 1 minute.
2. An electric appliance consumes 4500 J of energy in 30 minutes, while operating at 24V. Calculate the current drawn from cell.
3. An electric iron is rated 750 W - 250 V. Calculate the energy consumed by iron in 16 hours.
4. An electric appliance having a resistance of 200 Ω. is operated at 200 V. Calculate the energy consumed by appliance in 5 minutes.
5. A bulb is joined to a battery of e.m.f. 6V. A steady current of 0.5 A flows through circuit. Calculate the total energy provided by battery in 5 minutes.
6. An electric bulb is rated 100 W - 220V. It is connected to 220 V supply. Calculate:
   (a) Resistance of filament
   (b) current flowing through the filament.
7. An electric kettle draws a current of 4A for 2.5 minutes. If the resistance of heating element is 100 Ω, calculate the electric energy drawn by the kettle in kilojoules.
8. A soldering iron draws energy of 4500 J in 4 minutes when current flowing through its element is 6 A. Calculate the resistance of its heating element.
9. Calculate the heat energy given out by the filament of an electric bulb in 20 s, when resistance of it is 4 Ω and p.d. across its terminals is 12V.
10. An electric appliance gives out 66000 J of heat energy in 1 minute, when current flows through it, at a p.d. of 24 V. Find the resistance of the device.
11. An electric heater draws a current of 3.5 A at a p.d. of 250 V. Calculate the power of 4 such heaters.
12. An electric bulb is rated 500 W - 200V. Calculate the magnitude of the current.
13. An electric heater of power 1000 W, draws a current of 4.5 A. Calculate the line voltage.
14. An electric heater has a resistance of 40 Ω and draws a current of 4 A. Calculate:
   (a) its power
   (b) p.d. at its ends.
15. An electric heater of power 1600 W, has a resistance of 36 Ω. Calculate the magnitude of current and p.d. at its ends.
16. An electric motor of power 750 W, operates at 250 V. Calculate the resistance of motor and current flowing through it.
17. An electric device operates at 24 V and has a resistance of 8 Ω. Calculate the power of device and current flowing through it.

DPP – 9 Electricity

1. An electric bulb is rated 200W - 200V. It is immersed in 200 g of oil (S.H.C. 0.8 $Jg^{-1}\,°C^{-1}$) at 10 °C. The bulb is switched on for 2 minutes. If all the electric energy is absorbed in the form of heat energy by the oil, calculate:
   (a) Resistance of filament of bulb,
   (b) Current flowing through bulb,
   (c) Final temperature.
2. An electric kettle is rated 1000 W - 250V. It is used to bring water at 20°C to its boiling point. If the kettle is switched on for 1 minute, calculate:
   (a) Resistance of the element of kettle,
   (b) current flowing through element,
   (c) Mass of water in kettle.
3. Calculate the resistance of a nichrome wire, which will bring 200 g of water at 20°C to its boiling point in 8 minutes, when current flowing through wire is 4 A.
4. Calculate the current flowing through an electric drill, connected to 200 V supply, if it drills a hole in metal plate of mass 500 g, such that its temperature rises from 10°C to 60°C in 5 minutes, assuming all electric work done is converted into heat energy.
   [Specific heat capacity of metal is 0.6 $Jg^{-1}\,°C^{-1}$].
5. A bulb is joined to a battery of e.m.f. 4 V. and internal resistance of 2.5 Ω. A steady current of 0.5 A flows through circuit. Calculate:
   (a) Total energy provided by battery in 10 minutes.
   (b) Heat dissipated by bulb in 10 minutes.
6. A battery of 12 V and negligible internal resistance is connected to an external circuit, consisting of three resistors of 6 Ω, 3 Ω and 2 Ω in parallel, which is further connected to a resistance of 3 Ω. The resistance of 3 Ω is immersed in 50 g of oil of S.H.C 0.8 $Jg^{-1}°C^{-1}$, when the temperature rises by 60°C.
   (a) Draw the labelled circuit diagram,
   (b) Calculate the value of current in main circuit,
   (c) Calculate the current flowing in 2 Ω resistor in parallel,
   (d) Calculate the time for which current is switched on.
7. Two bulbs are rated 60 W – 220 V and 60 W – 110 V. Calculate the ratio of their resistances.
8. An electric kettle is rated 220 V and can bring certain amount of water to its boiling point in 5 minutes. If it is connected to the voltage supply of 200V, calculate the time in which the same amount of water will reach its boiling point.

9. An immersion heating rod is rated 220 V and can bring certain amount of water to its boiling point in 15 minutes. When this immersion rod is actually connected to an electric circuit, it brings the water to boil in 18.15 minutes. Calculate the line voltage.

10. A geyser is rated 1500 W - 250 V. If this geyser is connected to 250 V mains, calculate:

(a) Current drawn,

(b) Energy consumed in 50 hours,

(c) Cost of energy consumed in 50 hours at Rs. 7 per kilowatt hour.

11. An electric oven is marked 1000 W – 200 V. Calculate:

(a) Resistance of its element

(b) Energy consumed by oven in 1/2 h in joules.

(c) Time in which it will consume 15 kWh of energy.

12. A geyser is rated 2000 W and operates 2 hours a day on 200 V mains. Calculate the monthly bill for running geyser, when energy costs Rs. 5.90 per kWh.

13. An electric oven of resistance 20 Ω, draws a current of 10 A. It works 3 hours daily. Calculate the weekly bill, when energy costs Rs. 6.60 per kVAh.

14. An electric bulb draws a current of 0.8 A and works on 250 V, on the average 8 hours a day. If the energy costs Rs. 4.50 per board of trade unit, calculate the monthly bill.

15. 4 tubelights of 40 W each and 2 fans of 100 W each are connected to 200V mains and operate on the average 8 hours a day. If the energy costs Rs. 5 per kWh, calculate:

(a) Monthly bill,

(b) Minimum fuse rating.

16. A boys' hostel has following appliances, when energy is supplied at 200 V and costs Rs. 5.75 per kilowatt hour. **(i)** 40 bulbs of 100W each, working 8 hours a day, **(ii)** 20 fans, each drawing a current of 0.8 A and working 15 hours a day. Calculate:

(a) Monthly bill

(b) Amongst the fuses 35A and 37A, which one will you use and why?

17. Power is supplied at 200 V and at the rate of Rs. 1.50 kWh to the following electric appliances. **(i)** Two T.V. sets, each of resistance 200 Ω and working 4 hours a day. **(ii)** Two electric motors of 1.5 H.P. each working 4 hours a day. Calculate :

(a) Monthly bill,

(b) Minimum fuse rating.

18. Calculate the electric energy in the SI units, consumed by 100 W bulb and 60 W fan, connected in parallel for 5 minutes.