

PHYSICS · JEE MAIN

# Current Electricity

Chapter-wise previous year questions, with answer key

**96**

PYQS

**2020–2025**

PAPERS

**7**

TOPICS

Ohm's Law and Resistance

EMF and Internal Resistance

Electrical Power

Potentiometer

Drift Velocity and Mobility

Electrical Power and Heating

Wheatstone and Metre Bridge

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

## Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap “Step-by-step solution” under it.

Practise this chapter online with instant answer checking: [prepwiser.in/learn](https://prepwiser.in/learn) · No signup needed to browse

## Ohm's Law and Resistance · 43 PYQs

---

**Q1** JEE Main 2025 · 28 Jan · Shift 1

A wire of resistance  $R$  is bent into an equilateral triangle and an identical wire is bent into a square. The ratio of resistance between the two end points of an edge of the triangle to that of the square is

- (A)  $8/9$  (B)  $9/8$   
(C)  $32/27$  (D)  $27/32$

[Step-by-step solution ► prepwisser.in/questions/rVAQPQ1pZC](https://www.prepwisser.in/questions/rVAQPQ1pZC)

---

**Q2** JEE Main 2025 · 24 Jan · Shift 1

A wire of resistance  $9\Omega$  is bent to form an equilateral triangle. Then the equivalent resistance across any two vertices will be \_\_\_\_\_ ohm.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/naAp226T6N](https://www.prepwisser.in/questions/naAp226T6N)

---

**Q3** JEE Main 2024 · 9 Apr · Shift 2

At room temperature ( $27^\circ\text{C}$ ), the resistance of a heating element is  $50\Omega$ . The temperature coefficient of the material is  $2.4 \times 10^{-4}^\circ\text{C}^{-1}$ . The temperature of the element, when its resistance is  $62\Omega$ , is \_\_\_\_\_  $^\circ\text{C}$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/7ybxJqmHKv](https://www.prepwisser.in/questions/7ybxJqmHKv)

---

**Q4** JEE Main 2024 · 8 Apr · Shift 1

Resistance of a wire at  $0^\circ\text{C}$ ,  $100^\circ\text{C}$  and  $t^\circ\text{C}$  is found to be  $10\Omega$ ,  $10.2\Omega$  and  $10.95\Omega$  respectively. The temperature  $t$  in Kelvin scale is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/MPgAEF\\_ith](https://www.prepwisser.in/questions/MPgAEF_ith)

---

**Q5** JEE Main 2024 · 6 Apr · Shift 1

A wire of resistance  $R$  and radius  $r$  is stretched till its radius became  $r/2$ . If new resistance of the stretched wire is  $xR$ , then value of  $x$  is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/2ShinZ6MM1](https://www.prepwisser.in/questions/2ShinZ6MM1)

---

**Q6** JEE Main 2024 · 5 Apr · Shift 2

A wire of resistance  $20\Omega$  is divided into 10 equal parts, resulting pairs. A combination of two parts are connected in parallel and so on. Now resulting pairs of parallel combination are connected in series. The equivalent resistance of final combination is \_\_\_\_\_  $\Omega$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/\\_ryAiyGHsA](https://www.prepwisser.in/questions/_ryAiyGHsA)

---

**Q7** JEE Main 2024 · 5 Apr · Shift 1

The electric field between the two parallel plates of a capacitor of  $1.5\mu\text{F}$  capacitance drops to one third of its initial value in  $6.6\mu\text{s}$  when the plates are connected by a thin wire. The resistance of this wire is \_\_\_\_\_  $\Omega$ . (Given,  $\log 3 = 1.1$ )

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ZtDfD8TjH\\_](https://www.prepwiser.in/questions/ZtDfD8TjH_)

**Q8** JEE Main 2024 · 4 Apr · Shift 2

Two wires  $A$  and  $B$  are made up of the same material and have the same mass. Wire  $A$  has radius of  $2.0\text{mm}$  and wire  $B$  has radius of  $4.0\text{mm}$ . The resistance of wire  $B$  is  $2\Omega$ . The resistance of wire  $A$  is \_\_\_\_\_  $\Omega$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/iI8pphZ1oA](https://www.prepwiser.in/questions/iI8pphZ1oA)

**Q9** JEE Main 2024 · 1 Feb · Shift 1

The current in a conductor is expressed as  $I = 3t^2 + 4t^3$ , where  $I$  is in Ampere and  $t$  is in second. The amount of electric charge that flows through a section of the conductor during  $t = 1\text{s}$  to  $t = 2\text{s}$  is \_\_\_\_\_ C.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/kxAqF\\_SH8I](https://www.prepwiser.in/questions/kxAqF_SH8I)

**Q10** JEE Main 2024 · 31 Jan · Shift 1

Two conductors have the same resistances at  $0^\circ\text{C}$  but their temperature coefficients of resistance are  $\alpha_1$  and  $\alpha_2$ . The respective temperature coefficients for their series and parallel combinations are :

(A)  $\alpha_1 + \alpha_2, \frac{\alpha_1\alpha_2}{\alpha_1 + \alpha_2}$

(B)  $\frac{\alpha_1 + \alpha_2}{2}, \frac{\alpha_1 + \alpha_2}{2}$

(C)  $\alpha_1 + \alpha_2, \frac{\alpha_1 + \alpha_2}{2}$

(D)  $\frac{\alpha_1 + \alpha_2}{2}, \alpha_1 + \alpha_2$

[Step-by-step solution ► prepwiser.in/questions/01Pf4No0dS](https://www.prepwiser.in/questions/01Pf4No0dS)

**Q11** JEE Main 2024 · 30 Jan · Shift 1

An electric toaster has resistance of  $60\Omega$  at room temperature ( $27^\circ\text{C}$ ). The toaster is connected to a  $220\text{V}$  supply. If the current flowing through it reaches  $2.75\text{A}$ , the temperature attained by toaster is around : (if  $\alpha = 2 \times 10^{-4}/^\circ\text{C}$ )

(A)  $1235^\circ\text{C}$

(B)  $1667^\circ\text{C}$

(C)  $694^\circ\text{C}$

(D)  $1694^\circ\text{C}$

[Step-by-step solution ► prepwiser.in/questions/2G2rdI3QV3](https://www.prepwiser.in/questions/2G2rdI3QV3)

**Q12** JEE Main 2024 · 29 Jan · Shift 1

The electric current through a wire varies with time as  $I = I_0 + \beta t$ , where  $I_0 = 20\text{A}$  and  $\beta = 3\text{A/s}$ . The amount of electric charge crossed through a section of the wire in  $20\text{s}$  is :

(A)  $80\text{ C}$

(B)  $800\text{ C}$

(C)  $1000\text{ C}$

(D)  $1600\text{ C}$

[Step-by-step solution ► prepwiser.in/questions/O7TfK0aKUY](https://www.prepwiser.in/questions/O7TfK0aKUY)

**Q13** JEE Main 2024 · 27 Jan · Shift 1

A wire of resistance  $R$  and length  $L$  is cut into 5 equal parts. If these parts are joined parallelly, then resultant resistance will be :

- (A)  $\frac{1}{25}R$  (B)  $\frac{1}{5}R$   
(C)  $25R$  (D)  $5R$

[Step-by-step solution ► prepwisser.in/questions/gMyA-wVy8t](https://www.prepwisser.in/questions/gMyA-wVy8t)

---

**Q14** JEE Main 2023 · 15 Apr · Shift 1

Given below are two statements:

**Statement I :** The equivalent resistance of resistors in a series combination is smaller than least resistance used in the combination.

**Statement II :** The resistivity of the material is independent of temperature.

In the light of the above statements, choose the correct answer from the options given below :

- (A) Statement I is true but Statement II is false  
(B) Both Statement I and Statement II are true  
(C) Both Statement I and Statement II are false  
(D) Statement I is false but Statement II is true

[Step-by-step solution ► prepwisser.in/questions/8YW-u43-Xx](https://www.prepwisser.in/questions/8YW-u43-Xx)

---

**Q15** JEE Main 2023 · 12 Apr · Shift 1

The current flowing through a conductor connected across a source is  $2A$  and  $1.2A$  at  $0^\circ C$  and  $100^\circ C$  respectively. The current flowing through the conductor at  $50^\circ C$  will be \_\_\_\_\_  $\times 10^2 mA$ .

*Numerical answer — enter the value.*

[Step-by-step solution ► prepwisser.in/questions/1NADIo7-XC](https://www.prepwisser.in/questions/1NADIo7-XC)

---

**Q16** JEE Main 2023 · 12 Apr · Shift 1

A wire of resistance  $160\Omega$  is melted and drawn in a wire of one-fourth of its length. The new resistance of the wire will be

- (A)  $640\Omega$  (B)  $40\Omega$   
(C)  $16\Omega$  (D)  $10\Omega$

[Step-by-step solution ► prepwisser.in/questions/mreVwrBKLj](https://www.prepwisser.in/questions/mreVwrBKLj)

---

**Q17** JEE Main 2023 · 10 Apr · Shift 1

10 resistors each of resistance  $10\Omega$  can be connected in such as to get maximum and minimum equivalent resistance. The ratio of maximum and minimum equivalent resistance will be \_\_\_\_\_.

*Numerical answer — enter the value.*

[Step-by-step solution ► prepwisser.in/questions/xFkrLM\\_-Ao](https://www.prepwisser.in/questions/xFkrLM_-Ao)

---

**Q18** JEE Main 2023 · 10 Apr · Shift 2

A rectangular parallelopiped is measured as  $1\text{cm} \times 1\text{cm} \times 100\text{cm}$ . If its specific resistance is  $3 \times 10^{-7}\Omega\text{m}$ , then the resistance between its two opposite rectangular faces will be \_\_\_\_\_  $\times 10^{-7}\Omega$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/P9-5cinXZO](https://www.prepwiser.in/questions/P9-5cinXZO)

**Q19** JEE Main 2023 · 6 Apr · Shift 1

The length of a metallic wire is increased by 20% and its area of cross section is reduced by 4%. The percentage change in resistance of the metallic wire is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Za4ROTi\\_Qq](https://www.prepwiser.in/questions/Za4ROTi_Qq)

**Q20** JEE Main 2023 · 1 Feb · Shift 2

Given below are two statements : One is labelled as Assertion **A** and the other is labelled as Reason **R**.

Assertion A : For measuring the potential difference across a resistance of  $600\Omega$ , the voltmeter with resistance  $1000\Omega$  will be preferred over voltmeter with resistance  $4000\Omega$ .

Reason R : Voltmeter with higher resistance will draw smaller current than voltmeter with lower resistance.

In the light of the above statements, choose the most appropriate answer from the options given below.

- (A) **A** is not correct but **R** is correct
- (B) Both **A** and **R** are correct and **R** is the correct explanation of **A**
- (C) **A** is correct but **R** is not correct
- (D) Both **A** and **R** are correct but **R** is not the correct explanation of **A**

[Step-by-step solution ► prepwiser.in/questions/2gaVk7RqeU](https://www.prepwiser.in/questions/2gaVk7RqeU)

**Q21** JEE Main 2023 · 1 Feb · Shift 2

Equivalent resistance between the adjacent corners of a regular  $n$ -sided polygon of uniform wire of resistance  $R$  would be :

- (A)  $\frac{(n-1)R}{n^2}$
- (B)  $\frac{n^2 R}{n-1}$
- (C)  $\frac{(n-1)R}{(2n-1)}$
- (D)  $\frac{(n-1)R}{n}$

[Step-by-step solution ► prepwiser.in/questions/J1pL6kWdSg](https://www.prepwiser.in/questions/J1pL6kWdSg)

**Q22** JEE Main 2023 · 25 Jan · Shift 1

A uniform metallic wire carries a current 2 A, when 3.4 V battery is connected across it. The mass of uniform metallic wire is  $8.92 \times 10^{-3} \text{ kg}$ , density is  $8.92 \times 10^3 \text{ kg/m}^3$  and resistivity is  $1.7 \times 10^{-8} \Omega\text{-m}$ . The length of wire is :

- (A)  $l = 100 \text{ m}$
- (B)  $l = 6.8 \text{ m}$
- (C)  $l = 5 \text{ m}$
- (D)  $l = 10 \text{ m}$

[Step-by-step solution ► prepwiser.in/questions/PvHmJgZQp-](https://www.prepwiser.in/questions/PvHmJgZQp-)

**Q23** JEE Main 2023 · 24 Jan · Shift 2

If a copper wire is stretched to increase its length by 20%. The percentage increase in resistance of the wire is \_\_\_\_\_%.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/PP7CGOp24U](https://www.prepwiser.in/questions/PP7CGOp24U)

**Q24** JEE Main 2023 · 24 Jan · Shift 1

A hollow cylindrical conductor has length of 3.14 m, while its inner and outer diameters are 4 mm and 8 mm respectively. The resistance of the conductor is  $n \times 10^{-3} \Omega$ . If the resistivity of the material is  $2.4 \times 10^{-8} \Omega\text{m}$ . The value of  $n$  is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/EfyPT7dBPO](https://www.prepwiser.in/questions/EfyPT7dBPO)

**Q25** JEE Main 2022 · 29 Jul · Shift 1

Two metallic wires of identical dimensions are connected in series. If  $\sigma_1$  and  $\sigma_2$  are the conductivities of the these wires respectively, the effective conductivity of the combination is :

- (A)  $\frac{\sigma_1 \sigma_2}{\sigma_1 + \sigma_2}$
- (B)  $\frac{2\sigma_1 \sigma_2}{\sigma_1 + \sigma_2}$
- (C)  $\frac{\sigma_1 + \sigma_2}{2\sigma_1 \sigma_2}$
- (D)  $\frac{\sigma_1 + \sigma_2}{\sigma_1 \sigma_2}$

[Step-by-step solution ► prepwiser.in/questions/gWgc7sZtuN](https://www.prepwiser.in/questions/gWgc7sZtuN)

**Q26** JEE Main 2022 · 29 Jul · Shift 2

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: Alloys such as constantan and manganin are used in making standard resistance coils.

Reason R: Constantan and manganin have very small value of temperature coefficient of resistance.

In the light of the above statements, choose the correct answer from the options given below.

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is NOT the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false but R is true.

[Step-by-step solution ► prepwiser.in/questions/-aOJHnFwx8](https://www.prepwiser.in/questions/-aOJHnFwx8)

**Q27** JEE Main 2022 · 29 Jul · Shift 2

A 1m long wire is broken into two unequal parts X and Y. The X part of the wire is stretched into another wire W. Length of W is twice the length of X and the resistance of W is twice that of Y. Find the ratio of length of X and Y.

- (A) 1 : 4
- (B) 1 : 2
- (C) 4 : 1
- (D) 2 : 1

[Step-by-step solution ► prepwiser.in/questions/MOG\\_XPaX1C](https://www.prepwiser.in/questions/MOG_XPaX1C)

**Q28** JEE Main 2022 · 28 Jul · Shift 1

A wire of resistance  $R_1$  is drawn out so that its length is increased by twice of its original length. The ratio of new resistance to original resistance is :

- (A) 9 : 1 (B) 1 : 9  
(C) 4 : 1 (D) 3 : 1

[Step-by-step solution ► prepwiser.in/questions/R3Tp2r7vEc](https://www.prepwiser.in/questions/R3Tp2r7vEc)

**Q29** JEE Main 2022 · 30 Jun · Shift 1

An electric cable of copper has just one wire of radius 9 mm. Its resistance is  $14\ \Omega$ . If this single copper wire of the cable is replaced by seven identical well insulated copper wires each of radius 3 mm connected in parallel, then the new resistance of the combination will be :

- (A)  $9\ \Omega$  (B)  $18\ \Omega$   
(C)  $28\ \Omega$  (D)  $126\ \Omega$

[Step-by-step solution ► prepwiser.in/questions/ye4yu0tRcc](https://www.prepwiser.in/questions/ye4yu0tRcc)

**Q30** JEE Main 2022 · 28 Jun · Shift 2

Resistance of the wire is measured as  $2\ \Omega$  and  $3\ \Omega$  at  $10^\circ\text{C}$  and  $30^\circ\text{C}$  respectively. Temperature co-efficient of resistance of the material of the wire is :

- (A)  $0.033\ ^\circ\text{C}^{-1}$   
(B)  $-0.033\ ^\circ\text{C}^{-1}$   
(C)  $0.011\ ^\circ\text{C}^{-1}$   
(D)  $0.055\ ^\circ\text{C}^{-1}$

[Step-by-step solution ► prepwiser.in/questions/AYLNX4fTUV](https://www.prepwiser.in/questions/AYLNX4fTUV)

**Q31** JEE Main 2022 · 25 Jun · Shift 2

The length of a given cylindrical wire is increased to double of its original length. The percentage increase in the resistance of the wire will be \_\_\_\_\_ %.

*Numerical answer — enter the value.*

[Step-by-step solution ► prepwiser.in/questions/BvYoKNLGaj](https://www.prepwiser.in/questions/BvYoKNLGaj)

**Q32** JEE Main 2022 · 24 Jun · Shift 2

What will be the most suitable combination of three resistors  $A = 2\ \Omega$ ,  $B = 4\ \Omega$ ,  $C = 6\ \Omega$  so that  $\left(\frac{22}{3}\right)\ \Omega$  is equivalent resistance of combination?

- (A) Parallel combination of A and C connected in series with B.  
(B) Parallel combination of A and B connected in series with C.  
(C) Series combination of A and C connected in parallel with B.  
(D) Series combination of B and C connected in parallel with A.

[Step-by-step solution ► prepwiser.in/questions/u1eGJ-M6r8](https://www.prepwiser.in/questions/u1eGJ-M6r8)

**Q33** JEE Main 2021 · 27 Aug · Shift 1

First, a set of  $n$  equal resistors of  $10\ \Omega$  each are connected in series to a battery of emf  $20\text{V}$  and internal resistance  $10\ \Omega$ . A current  $I$  is observed to flow. Then, the  $n$  resistors are connected in parallel to the same battery. It is observed that the current is increased 20 times, then the value of  $n$  is .....

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/L3Z0QAXe6F](https://www.prepwiser.in/questions/L3Z0QAXe6F)

**Q34** JEE Main 2021 · 26 Aug · Shift 1

What equal length of an iron wire and a copper-nickel alloy wire, each of  $2\text{ mm}$  diameter connected parallel to give an equivalent resistance of  $3\ \Omega$  ?

(Given resistivities of iron and copper-nickel alloy wire are  $12\ \mu\Omega$  and  $51\ \mu\Omega\text{ cm}$  respectively)

- (A)  $82\text{ m}$  (B)  $97\text{ m}$   
(C)  $110\text{ m}$  (D)  $90\text{ m}$

[Step-by-step solution ► prepwiser.in/questions/\\_SiFsy\\_pO1](https://www.prepwiser.in/questions/_SiFsy_pO1)

**Q35** JEE Main 2021 · 27 Jul · Shift 2

The resistance of a conductor at  $15^\circ\text{C}$  is  $16\ \Omega$  and at  $100^\circ\text{C}$  is  $20\ \Omega$ . What will be the temperature coefficient of resistance of the conductor?

- (A)  $0.010^\circ\text{C}^{-1}$   
(B)  $0.033^\circ\text{C}^{-1}$   
(C)  $0.003^\circ\text{C}^{-1}$   
(D)  $0.042^\circ\text{C}^{-1}$

[Step-by-step solution ► prepwiser.in/questions/NhtS57c90F](https://www.prepwiser.in/questions/NhtS57c90F)

**Q36** JEE Main 2021 · 20 Jul · Shift 1

A current of  $5\text{ A}$  is passing through a non-linear magnesium wire of cross-section  $0.04\text{ m}^2$ . At every point the direction of current density is at an angle of  $60^\circ$  with the unit vector of area of cross-section. The magnitude of electric field at every point of the conductor is :

(Resistivity of magnesium  $\rho = 44 \times 10^{-8}\ \Omega\text{m}$ )

- (A)  $11 \times 10^{-5}\text{ V/m}$   
(B)  $11 \times 10^{-3}\text{ V/m}$   
(C)  $11 \times 10^{-7}\text{ V/m}$   
(D)  $11 \times 10^{-2}\text{ V/m}$

[Step-by-step solution ► prepwiser.in/questions/pa-b3MIiYw](https://www.prepwiser.in/questions/pa-b3MIiYw)

**Q37** JEE Main 2021 · 18 Mar · Shift 2

Two wires of same length and thickness having specific resistances  $6\ \Omega\text{ cm}$  and  $3\ \Omega\text{ cm}$  respectively are connected in parallel. The effective resistivity is  $\rho\ \Omega\text{cm}$ . The value of  $\rho$ , to the nearest integer, is

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/7ZmEMw6UG-](https://www.prepwiser.in/questions/7ZmEMw6UG-)

**Q38** JEE Main 2021 · 17 Mar · Shift 1

The equivalent resistance of series combination of two resistors is 's'. When they are connected in parallel, the equivalent resistance is 'p'. If  $s = np$ , then the minimum value for n is \_\_\_\_\_. (Round off to the Nearest Integer)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/SuE8g2CoyC](https://www.prepwiser.in/questions/SuE8g2CoyC)

**Q39** JEE Main 2021 · 16 Mar · Shift 1

A conducting wire of length 'l', area of cross-section A and electric resistivity  $\rho$  is connected between the terminals of a battery. A potential difference V is developed between its ends, causing an electric current.

If the length of the wire of the same material is doubled and the area of cross-section is halved, the resultant current would be :

- (A)  $4 \frac{VA}{\rho l}$  (B)  $\frac{3}{4} \frac{VA}{\rho l}$   
(C)  $\frac{1}{4} \frac{VA}{\rho l}$  (D)  $\frac{1}{4} \frac{\rho l}{VA}$

[Step-by-step solution ► prepwiser.in/questions/IFWM-vWCo4](https://www.prepwiser.in/questions/IFWM-vWCo4)

**Q40** JEE Main 2021 · 26 Feb · Shift 2

A wire of  $1\Omega$  has a length of 1 m. It is stretched till its length increases by 25%. The percentage change in resistance to the nearest integer is :

- (A) 76% (B) 12.5%  
(C) 25% (D) 56%

[Step-by-step solution ► prepwiser.in/questions/oJP-XsWgWr](https://www.prepwiser.in/questions/oJP-XsWgWr)

**Q41** JEE Main 2021 · 24 Feb · Shift 1

A current through a wire depends on time as

$$i = \alpha_0 t + \beta t^2$$

where  $\alpha_0 = 20 \text{ A/s}$  and  $\beta = 8 \text{ As}^{-2}$ . Find the charge crossed through a section of the wire in 15 s.

- (A) 2250 C (B) 2100 C  
(C) 260 C (D) 11250 C

[Step-by-step solution ► prepwiser.in/questions/3rs0\\_0nFJP](https://www.prepwiser.in/questions/3rs0_0nFJP)

**Q42** JEE Main 2021 · 24 Feb · Shift 2

A cylindrical wire of radius 0.5 mm and conductivity  $5 \times 10^7 \text{ S/m}$  is subjected to an electric field of 10 mV/m. The expected value of current in the wire will be  $x^3 \pi \text{ mA}$ . The value of x is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/6Pz\\_8A3FT1](https://www.prepwiser.in/questions/6Pz_8A3FT1)

**Q43** JEE Main 2020 · 2 Sep · Shift 1

Consider four conducting materials copper, tungsten, mercury and aluminium with resistivity  $\rho_C$ ,  $\rho_T$ ,  $\rho_M$  and  $\rho_A$  respectively. Then :

- (A)  $\rho_C > \rho_A > \rho_T$
- (B)  $\rho_M > \rho_A > \rho_C$
- (C)  $\rho_A > \rho_T > \rho_C$
- (D)  $\rho_A > \rho_M > \rho_C$

[Step-by-step solution ► prepwiser.in/questions/T7eDaSizAp](https://www.prepwiser.in/questions/T7eDaSizAp)

## EMF and Internal Resistance · 8 PYQs

**Q44** JEE Main 2025 · 22 Jan · Shift 1

Given below are two statements :

Statement-I : The equivalent emf of two nonideal batteries connected in parallel is smaller than either of the two emfs.

Statement-II : The equivalent internal resistance of two nonideal batteries connected in parallel is smaller than the internal resistance of either of the two batteries.

In the light of the above statements, choose the correct answer from the options given below.

- (A) Statement-I is false but Statement-II is true
- (B) Statement-I is true but Statement-II is false
- (C) Both Statement-I and Statement-II are false
- (D) Both Statement-I and Statement-II are true

[Step-by-step solution ► prepwiser.in/questions/IgIDZxU8ht](https://www.prepwiser.in/questions/IgIDZxU8ht)

**Q45** JEE Main 2023 · 11 Apr · Shift 2

Two identical cells each of emf 1.5V are connected in series across a  $10\Omega$  resistance. An ideal voltmeter connected across  $10\Omega$  resistance reads 1.5V. The internal resistance of each cell is \_\_\_\_\_  $\Omega$ .

*Numerical answer — enter the value.*

[Step-by-step solution ► prepwiser.in/questions/jK0er63LLs](https://www.prepwiser.in/questions/jK0er63LLs)

**Q46** JEE Main 2023 · 31 Jan · Shift 1

Two identical cells, when connected either in parallel or in series gives same current in an external resistance  $5\Omega$ . The internal resistance of each cell will be \_\_\_\_\_  $\Omega$ .

*Numerical answer — enter the value.*

[Step-by-step solution ► prepwiser.in/questions/aeZ4ZnnqoM](https://www.prepwiser.in/questions/aeZ4ZnnqoM)

**Q47** JEE Main 2023 · 24 Jan · Shift 2

A cell of emf 90 V is connected across series combination of two resistors each of  $100\Omega$  resistance. A voltmeter of resistance  $400\Omega$  is used to measure the potential difference across each resistor. The reading of the voltmeter will be :

- (A) 40 V
- (B) 90 V
- (C) 45 V
- (D) 80 V

[Step-by-step solution ► prepwiser.in/questions/q6iNPSK6dq](https://www.prepwiser.in/questions/q6iNPSK6dq)

**Q48** JEE Main 2022 · 29 Jun · Shift 2

The combination of two identical cells, whether connected in series or parallel combination provides the same current through an external resistance of  $2\Omega$ . The value of internal resistance of each cell is

- (A)  $2\Omega$  (B)  $4\Omega$   
(C)  $6\Omega$  (D)  $8\Omega$

[Step-by-step solution ► prepwisser.in/questions/FFiVd8oi1h](https://www.prepwisser.in/questions/FFiVd8oi1h)

**Q49** JEE Main 2021 · 27 Aug · Shift 1

Five identical cells each of internal resistance  $1\Omega$  and emf  $5V$  are connected in series and in parallel with an external resistance 'R'. For what value of 'R', current in series and parallel combination will remain the same?

- (A)  $1\Omega$  (B)  $25\Omega$   
(C)  $5\Omega$  (D)  $10\Omega$

[Step-by-step solution ► prepwisser.in/questions/yWLj8nI8p0](https://www.prepwisser.in/questions/yWLj8nI8p0)

**Q50** JEE Main 2021 · 26 Feb · Shift 1

In an electrical circuit, a battery is connected to pass  $20C$  of charge through it in a certain given time. The potential difference between two plates of the battery is maintained at  $15V$ . The workdone by the battery is \_\_\_\_\_J.

*Numerical answer — enter the value.*

[Step-by-step solution ► prepwisser.in/questions/cr6YHS3ITD](https://www.prepwisser.in/questions/cr6YHS3ITD)

**Q51** JEE Main 2020 · 4 Sep · Shift 1

A battery of  $3.0V$  is connected to a resistor dissipating  $0.5W$  of power. If the terminal voltage of the battery is  $2.5V$ , the power dissipated within the internal resistance is :

- (A)  $0.50W$  (B)  $0.072W$   
(C)  $0.10W$  (D)  $0.125W$

[Step-by-step solution ► prepwisser.in/questions/8uvogUSA5P](https://www.prepwisser.in/questions/8uvogUSA5P)

## Electrical Power · 5 PYQs

**Q52** JEE Main 2025 · 2 Apr · Shift 1

The battery of a mobile phone is rated as  $4.2V$ ,  $5800mAh$ . How much energy is stored in it when fully charged?

- (A)  $87.7kJ$  (B)  $43.8kJ$   
(C)  $48.7kJ$  (D)  $24.4kJ$

[Step-by-step solution ► prepwisser.in/questions/qAoNRCAKU6](https://www.prepwisser.in/questions/qAoNRCAKU6)

**Q53** JEE Main 2024 · 4 Apr · Shift 2

An electric bulb rated  $50W - 200V$  is connected across a  $100V$  supply. The power dissipation of the bulb is:

- (A)  $100W$  (B)  $50W$   
(C)  $12.5W$  (D)  $25W$

[Step-by-step solution ► prepwisser.in/questions/cwYAF6Hpr2](https://www.prepwisser.in/questions/cwYAF6Hpr2)

**Q54** JEE Main 2024 · 30 Jan · Shift 2

When a potential difference  $V$  is applied across a wire of resistance  $R$ , it dissipates energy at a rate  $W$ . If the wire is cut into two halves and these halves are connected mutually parallel across the same supply, the energy dissipation rate will become:

- (A)  $1/2W$  (B)  $4W$   
(C)  $1/4W$  (D)  $2W$

[Step-by-step solution ► prepwiser.in/questions/piB9CV9QK5](https://www.prepwiser.in/questions/piB9CV9QK5)

**Q55** JEE Main 2023 · 11 Apr · Shift 1

Two identical heater filaments are connected first in parallel and then in series. At the same applied voltage, the ratio of heat produced in same time for parallel to series will be:

- (A) 4 : 1 (B) 1 : 4  
(C) 2 : 1 (D) 1 : 2

[Step-by-step solution ► prepwiser.in/questions/UurfCDsF3v](https://www.prepwiser.in/questions/UurfCDsF3v)

**Q56** JEE Main 2020 · 5 Sep · Shift 1

An electrical power line, having a total resistance of  $2\ \Omega$ , delivers 1 kW at 220 V. The efficiency of the transmission line is approximately :

- (A) 85% (B) 96%  
(C) 72% (D) 91%

[Step-by-step solution ► prepwiser.in/questions/-Z\\_kb5bnBm](https://www.prepwiser.in/questions/-Z_kb5bnBm)

## Potentiometer · 9 PYQs

**Q57** JEE Main 2024 · 4 Apr · Shift 1

To measure the internal resistance of a battery, potentiometer is used. For  $R = 10\ \Omega$ , the balance point is observed at  $l = 500\text{cm}$  and for  $R = 1\ \Omega$  the balance point is observed at  $l = 400\text{cm}$ . The internal resistance of the battery is approximately :

- (A)  $0.1\ \Omega$  (B)  $0.3\ \Omega$   
(C)  $0.2\ \Omega$  (D)  $0.4\ \Omega$

[Step-by-step solution ► prepwiser.in/questions/bFvvayjst3](https://www.prepwiser.in/questions/bFvvayjst3)

**Q58** JEE Main 2023 · 1 Feb · Shift 1

In an experiment to find emf of a cell using potentiometer, the length of null point for a cell of emf  $1.5\text{V}$  is found to be  $60\text{cm}$ . If this cell is replaced by another cell of emf  $E$ , the length-of null point increases by  $40\text{cm}$ . The value of  $E$  is  $\frac{x}{10}\text{V}$ . The value of  $x$  is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/FS10iylhtg](https://www.prepwiser.in/questions/FS10iylhtg)

**Q59** JEE Main 2023 · 29 Jan · Shift 2

A null point is found at 200 cm in potentiometer when cell in secondary circuit is shunted by  $5\Omega$ . When a resistance of  $15\Omega$  is used for shunting, null point moves to 300 cm. The internal resistance of the cell is \_\_\_\_\_  $\Omega$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/4lY\\_y-Mjyu](https://www.prepwiser.in/questions/4lY_y-Mjyu)

**Q60** JEE Main 2023 · 29 Jan · Shift 2

With the help of potentiometer, we can determine the value of emf of a given cell. The sensitivity of the potentiometer is

- (A) directly proportional to the length of the potentiometer wire
- (B) directly proportional to the potential gradient of the wire
- (C) inversely proportional to the potential gradient of the wire
- (D) inversely proportional to the length of the potentiometer wire

Choose the correct option for the above statements :

- |                  |                      |
|------------------|----------------------|
| (A) A only       | (B) B and D only     |
| (C) A and C only | (D) inversely C only |

[Step-by-step solution ► prepwiser.in/questions/w0DGyqZFdz](https://www.prepwiser.in/questions/w0DGyqZFdz)

**Q61** JEE Main 2022 · 26 Jul · Shift 2

A potentiometer wire of length 300cm is connected in series with a resistance  $780\Omega$  and a standard cell of emf 4V. A constant current flows through potentiometer wire. The length of the null point for cell of emf 20 mV is found to be 60cm. The resistance of the potentiometer wire is \_\_\_\_\_  $\Omega$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/S4AJ8\\_ScSW](https://www.prepwiser.in/questions/S4AJ8_ScSW)

**Q62** JEE Main 2022 · 25 Jul · Shift 2

In a potentiometer arrangement, a cell of emf 1.20 V gives a balance point at 36 cm length of wire. This cell is now replaced by another cell of emf 1.80 V. The difference in balancing length of potentiometer wire in above conditions will be \_\_\_\_\_ cm.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/P\\_7gsgqnvD](https://www.prepwiser.in/questions/P_7gsgqnvD)

**Q63** JEE Main 2022 · 24 Jun · Shift 1

In a potentiometer arrangement, a cell gives a balancing point at 75 cm length of wire. This cell is now replaced by another cell of unknown emf. If the ratio of the emf's of two cells respectively is 3 : 2, the difference in the balancing length of the potentiometer wire in above two cases will be \_\_\_\_\_ cm.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/VnTd\\_80Ii](https://www.prepwiser.in/questions/VnTd_80Ii)

**Q64** JEE Main 2020 · 8 Jan · Shift 1

The length of a potentiometer wire is 1200 cm and it carries a current of 60 mA. For a cell of emf 5V and internal resistance of  $20\Omega$ , the null point on it is found to be a 1000 cm. The resistance of whole wire is :

- (A)  $80\Omega$  (B)  $60\Omega$   
(C)  $120\Omega$  (D)  $100\Omega$

[Step-by-step solution](#) ► [prepwisar.in/questions/kYI3SS25Cf](https://www.prepwisar.in/questions/kYI3SS25Cf)

**Q65** JEE Main 2020 · 7 Jan · Shift 2

The balancing length for a cell is 560 cm in a potentiometer experiment. When an external resistance of  $10\Omega$  is connected in parallel to the cell, the balancing length changes by 60 cm. If the internal resistance of the cell is  $\frac{N}{10}\Omega$ , where N is an integer then value of N is .....

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwisar.in/questions/K9Vwg9MJ-K](https://www.prepwisar.in/questions/K9Vwg9MJ-K)

## Drift Velocity and Mobility · 9 PYQs

**Q66** JEE Main 2023 · 10 Apr · Shift 2

In a metallic conductor, under the effect of applied electric field, the free electrons of the conductor

- (A) move in the straight line paths in the same direction  
(B) move with the uniform velocity throughout from lower potential to higher potential  
(C) drift from higher potential to lower potential.  
(D) move in the curved paths from lower potential to higher potential

[Step-by-step solution](#) ► [prepwisar.in/questions/Kx9-LLm06i](https://www.prepwisar.in/questions/Kx9-LLm06i)

**Q67** JEE Main 2023 · 8 Apr · Shift 2

The number density of free electrons in copper is nearly  $8 \times 10^{28}\text{m}^{-3}$ . A copper wire has its area of cross section =  $2 \times 10^{-6}\text{m}^2$  and is carrying a current of 3.2A. The drift speed of the electrons is \_\_\_\_\_  $\times 10^{-6}\text{ms}^{-1}$

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwisar.in/questions/tmMOLogJXt](https://www.prepwisar.in/questions/tmMOLogJXt)

**Q68** JEE Main 2023 · 8 Apr · Shift 1

A current of 2A flows through a wire of cross-sectional area  $25.0\text{mm}^2$ . The number of free electrons in a cubic meter are  $2.0 \times 10^{28}$ . The drift velocity of the electrons is \_\_\_\_\_  $\times 10^{-6}\text{ms}^{-1}$  (given, charge on electron =  $1.6 \times 10^{-19}\text{C}$ ).

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwisar.in/questions/9lmjk-7OGK](https://www.prepwisar.in/questions/9lmjk-7OGK)

**Q69** JEE Main 2023 · 31 Jan · Shift 1

The drift velocity of electrons for a conductor connected in an electrical circuit is  $V_d$ . The conductor is now replaced by another conductor with same material and same length but double the area of cross section. The applied voltage remains same. The new drift velocity of electrons will be

- (A)  $\frac{V_d}{4}$  (B)  $V_d$   
(C)  $2V_d$  (D)  $\frac{V_d}{2}$

[Step-by-step solution ► prepwiser.in/questions/ImerSJE0I7](https://www.prepwiser.in/questions/ImerSJE0I7)

**Q70** JEE Main 2022 · 27 Jul · Shift 1

A 1m long copper wire carries a current of 1A. If the cross section of the wire is  $2.0\text{mm}^2$  and the resistivity of copper is  $1.7 \times 10^{-8} \Omega\text{m}$ , the force experienced by moving electron in the wire is \_\_\_\_\_  $\times 10^{-23}\text{N}$ . (charge on electron =  $1.6 \times 10^{-19}\text{C}$ )

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/yf81b4MEi7](https://www.prepwiser.in/questions/yf81b4MEi7)

**Q71** JEE Main 2022 · 27 Jul · Shift 2

- (A) The drift velocity of electrons decreases with the increase in the temperature of conductor.  
(B) The drift velocity is inversely proportional to the area of cross-section of given conductor.  
(C) The drift velocity does not depend on the applied potential difference to the conductor.  
(D) The drift velocity of electron is inversely proportional to the length of the conductor.  
(E) The drift velocity increases with the increase in the temperature of conductor.

Choose the correct answer from the options given below :

- (A) (A) and (B) only (B) (A) and (D) only  
(C) (B) and (E) only (D) (B) and (C) only

[Step-by-step solution ► prepwiser.in/questions/cgOxEaM6e](https://www.prepwiser.in/questions/cgOxEaM6e)

**Q72** JEE Main 2022 · 27 Jun · Shift 1

The current density in a cylindrical wire of radius 4 mm is  $4 \times 10^6 \text{Am}^{-2}$ . The current through the outer portion of the wire between radial distances  $\frac{R}{2}$  and R is \_\_\_\_\_  $\pi \text{A}$ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/7Q1t9k\\_s46](https://www.prepwiser.in/questions/7Q1t9k_s46)

**Q73** JEE Main 2022 · 27 Jun · Shift 2

The current density in a cylindrical wire of radius  $r = 4.0 \text{mm}$  is  $1.0 \times 10^6 \text{A/m}^2$ . The current through the outer portion of the wire between radial distances  $\frac{r}{2}$  and r is  $x\pi \text{A}$ ; where x is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/vcBI4e3IIu](https://www.prepwiser.in/questions/vcBI4e3IIu)

**Q74** JEE Main 2021 · 17 Mar · Shift 1

A current of 10A exists in a wire of cross-sectional area of  $5 \text{ mm}^2$  with a drift velocity of  $2 \times 10^{-3} \text{ ms}^{-1}$ . The number of free electrons in each cubic meter of the wire is \_\_\_\_\_.

- (A)  $625 \times 10^{25}$
- (B)  $1 \times 10^{23}$
- (C)  $2 \times 10^{25}$
- (D)  $2 \times 10^6$

[Step-by-step solution](https://www.prepwiser.in/questions/rWmQ5dwWdJ) ► [prepwiser.in/questions/rWmQ5dwWdJ](https://www.prepwiser.in/questions/rWmQ5dwWdJ)

## Electrical Power and Heating · 17 PYQs

**Q75** JEE Main 2025 · 4 Apr · Shift 2

There are ' $n$ ' number of identical electric bulbs, each is designed to draw a power  $p$  independently from the mains supply. They are now joined in series across the mains supply. The total power drawn by the combination is :

- (A)  $np$
- (B)  $p$
- (C)  $\frac{p}{n^2}$
- (D)  $\frac{p}{n}$

[Step-by-step solution](https://www.prepwiser.in/questions/reWOFIaqod) ► [prepwiser.in/questions/reWOFIaqod](https://www.prepwiser.in/questions/reWOFIaqod)

**Q76** JEE Main 2025 · 3 Apr · Shift 2

A motor operating on 100 V draws a current of 1 A . If the efficiency of the motor is 91.6%, then the loss of power in units of cal/s is

- (A) 6.2
- (B) 2
- (C) 8.4
- (D) 4

[Step-by-step solution](https://www.prepwiser.in/questions/nhRlrG19rp) ► [prepwiser.in/questions/nhRlrG19rp](https://www.prepwiser.in/questions/nhRlrG19rp)

**Q77** JEE Main 2024 · 8 Apr · Shift 2

Water boils in an electric kettle in 20 minutes after being switched on. Using the same main supply, the length of the heating element should be \_\_\_\_\_ to \_\_\_\_\_ times of its initial length if the water is to be boiled in 15 minutes.

- (A) increased,  $\frac{3}{4}$
- (B) increased,  $\frac{4}{3}$
- (C) decreased,  $\frac{3}{4}$
- (D) decreased,  $\frac{4}{3}$

[Step-by-step solution](https://www.prepwiser.in/questions/OfNp8VvkrA) ► [prepwiser.in/questions/OfNp8VvkrA](https://www.prepwiser.in/questions/OfNp8VvkrA)

**Q78** JEE Main 2024 · 6 Apr · Shift 2

The number of electrons flowing per second in the filament of a 110W bulb operating at 220V is : (Given  $e = 1.6 \times 10^{-19} \text{ C}$ )

- (A)  $1.25 \times 10^{19}$
- (B)  $31.25 \times 10^{17}$
- (C)  $6.25 \times 10^{18}$
- (D)  $6.25 \times 10^{17}$

[Step-by-step solution](https://www.prepwiser.in/questions/IIkSySF60L) ► [prepwiser.in/questions/IIkSySF60L](https://www.prepwiser.in/questions/IIkSySF60L)

**Q79** JEE Main 2024 · 31 Jan · Shift 2

By what percentage will the illumination of the lamp decrease if the current drops by 20%?

- (A) 26% (B) 36%  
(C) 46% (D) 56%

[Step-by-step solution ► prepwiser.in/questions/t6dHfIm\\_zS](https://www.prepwiser.in/questions/t6dHfIm_zS)

**Q80** JEE Main 2023 · 13 Apr · Shift 1

A potential  $V_0$  is applied across a uniform wire of resistance  $R$ . The power dissipation is  $P_1$ . The wire is then cut into two equal halves and a potential of  $V_0$  is applied across the length of each half. The total power dissipation across two wires is  $P_2$ . The ratio  $P_2 : P_1$  is  $\sqrt{x} : 1$ . The value of  $x$  is \_\_\_\_\_.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/LbxIBxiXHT](https://www.prepwiser.in/questions/LbxIBxiXHT)

**Q81** JEE Main 2023 · 31 Jan · Shift 2

The amount of thermal energy is developed by a resistor in 10s when a current of 4A is passed through it. If the current is increased to 16A, the thermal energy developed by the resistor in 10s will be :

- (A)  $\frac{H}{4}$  (B) 16H  
(C) H (D) 4H

[Step-by-step solution ► prepwiser.in/questions/6PCg3baLme](https://www.prepwiser.in/questions/6PCg3baLme)

**Q82** JEE Main 2023 · 29 Jan · Shift 1

Ratio of thermal energy released in two resistors  $R$  and  $3R$  connected in parallel in an electric circuit is :

- (A) 1 : 1 (B) 1 : 27  
(C) 1 : 3 (D) 3 : 1

[Step-by-step solution ► prepwiser.in/questions/EK4G-CF5M-](https://www.prepwiser.in/questions/EK4G-CF5M-)

**Q83** JEE Main 2022 · 28 Jul · Shift 2

An electrical bulb rated 220 V, 100 W, is connected in series with another bulb rated 220 V, 60 W. If the voltage across combination is 220 V, the power consumed by the 100 W bulb will be about \_\_\_\_\_ W.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/1dI702zgsc](https://www.prepwiser.in/questions/1dI702zgsc)

**Q84** JEE Main 2022 · 28 Jul · Shift 2

Given below are two statements :

Statement I : A uniform wire of resistance  $80\ \Omega$  is cut into four equal parts. These parts are now connected in parallel. The equivalent resistance of the combination will be  $5\ \Omega$ .

Statement II: Two resistances  $2R$  and  $3R$  are connected in parallel in a electric circuit. The value of thermal energy developed in  $3R$  and  $2R$  will be in the ratio 3 : 2.

In the light of the above statements, choose the most appropriate answer from the option given below

- (A) Both statement I and statement II are correct  
(B) Both statement I and statement II are incorrect  
(C) Statement I is correct but statement II is incorrect  
(D) Statement I is incorrect but statement II is correct

[Step-by-step solution ► prepwiser.in/questions/FRsieGlpRk](https://www.prepwiser.in/questions/FRsieGlpRk)

**Q85** JEE Main 2022 · 29 Jun · Shift 1

Two coils require 20 minutes and 60 minutes respectively to produce same amount of heat energy when connected separately to the same source. If they are connected in parallel arrangement to the same source; the time required to produce same amount of heat by the combination of coils, will be \_\_\_\_\_ min.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/1c3U2pbHEU](https://www.prepwiser.in/questions/1c3U2pbHEU)

**Q86** JEE Main 2022 · 25 Jun · Shift 1

A resistor develops 300 J of thermal energy in 15 s, when a current of 2 A is passed through it. If the current increases to 3 A, the energy developed in 10 s is \_\_\_\_\_ J.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/tZYDg1bFdX](https://www.prepwiser.in/questions/tZYDg1bFdX)

**Q87** JEE Main 2021 · 1 Sep · Shift 2

A uniform heating wire of resistance  $36\Omega$  is connected across a potential difference of 240 V. The wire is then cut into half and potential difference of 240V is applied across each half separately. The ratio of power dissipation in first case to the total power dissipation in the second case would be 1 : x, where x is \_\_\_\_\_

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/YV7iXawKaT](https://www.prepwiser.in/questions/YV7iXawKaT)

**Q88** JEE Main 2021 · 31 Aug · Shift 2

A resistor dissipates 192 J of energy in 1s when a current of 4A is passed through it. Now, when the current is doubled, the amount of thermal energy dissipated in 5s in \_\_\_\_\_ J.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/HQolcMg2ha](https://www.prepwiser.in/questions/HQolcMg2ha)

**Q89** JEE Main 2021 · 16 Mar · Shift 2

The energy dissipated by a resistor is 10 mJ in 1 s when an electric current of 2 mA flows through it. The resistance is \_\_\_\_\_  $\Omega$ . (Round off to the Nearest Integer)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/voPAXLtxCU](https://www.prepwiser.in/questions/voPAXLtxCU)

**Q90** JEE Main 2021 · 16 Mar · Shift 2

A resistor develops 500 J of thermal energy in 20 s when a current of 1.5A is passed through it. If the current is increased from 1.5A to 3A, what will be the energy developed in 20 s.

(A) 1000 J

(B) 2000 J

(C) 1500 J

(D) 500 J

[Step-by-step solution ► prepwiser.in/questions/BuCrY6\\_vpD](https://www.prepwiser.in/questions/BuCrY6_vpD)

**Q91** JEE Main 2020 · 7 Jan · Shift 2

In a building there are 15 bulbs of 45 W, 15 bulbs of 100 W, 15 small fans of 10 W and 2 heaters of 1 kW. The voltage of electric main is 220 V. The minimum fuse capacity (rated value) of the building will be :

- (A) 15 A (B) 20 A  
(C) 25 A (D) 10 A

Step-by-step solution ► [prepwiser.in/questions/qkKt0bkPAc](https://www.prepwiser.in/questions/qkKt0bkPAc)

## Wheatstone and Metre Bridge · 5 PYQs

**Q92** JEE Main 2024 · 1 Feb · Shift 2

In a metre-bridge when a resistance in the left gap is  $2\Omega$  and unknown resistance in the right gap, the balance length is found to be 40cm. On shunting the unknown resistance with  $2\Omega$ , the balance length changes by :

- (A) 62.5 (B) 22.5cm  
(C) 20cm (D) 65cm

Step-by-step solution ► [prepwiser.in/questions/C0o3VZCJDC](https://www.prepwiser.in/questions/C0o3VZCJDC)

**Q93** JEE Main 2024 · 27 Jan · Shift 2

Wheatstone bridge principle is used to measure the specific resistance ( $S_1$ ) of given wire, having length  $L$ , radius  $r$ . If  $X$  is the resistance of wire, then specific resistance is ;  $S_1 = X \left( \frac{\pi r^2}{L} \right)$ . If the length of the wire gets doubled then the value of specific resistance will be :

- (A)  $\frac{S_1}{4}$  (B)  $2S_1$   
(C)  $\frac{S_1}{2}$  (D)  $S_1$

Step-by-step solution ► [prepwiser.in/questions/Q0NS9Hxcfr](https://www.prepwiser.in/questions/Q0NS9Hxcfr)

**Q94** JEE Main 2024 · 27 Jan · Shift 1

A wire of length 10cm and radius  $\sqrt{7} \times 10^{-4}\text{m}$  connected across the right gap of a meter bridge. When a resistance of  $4.5\Omega$  is connected on the left gap by using a resistance box, the balance length is found to be at 60cm from the left end. If the resistivity of the wire is  $R \times 10^{-7}\Omega\text{m}$ , then value of  $R$  is :

- (A) 63 (B) 70  
(C) 66 (D) 35

Step-by-step solution ► [prepwiser.in/questions/PP2bE\\_szhD](https://www.prepwiser.in/questions/PP2bE_szhD)

**Q95** JEE Main 2023 · 29 Jan · Shift 1

In a metre bridge experiment the balance point is obtained if the gaps are closed by  $2\Omega$  and  $3\Omega$ . A shunt of  $X\Omega$  is added to  $3\Omega$  resistor to shift the balancing point by 22.5 cm. The value of  $X$  is \_\_\_\_\_.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/hj0rGel3Qt](https://www.prepwiser.in/questions/hj0rGel3Qt)

**Q96**

JEE Main 2023 · 29 Jan · Shift 2

When two resistance  $R_1$  and  $R_2$  connected in series and introduced into the left gap of a meter bridge and a resistance of  $10\ \Omega$  is introduced into the right gap, a null point is found at 60 cm from left side. When  $R_1$  and  $R_2$  are connected in parallel and introduced into the left gap, a resistance of  $3\ \Omega$  is introduced into the right gap to get null point at 40 cm from left end. The product of  $R_1 R_2$  is \_\_\_\_\_  $\Omega^2$

Numerical answer — enter the value.

**Step-by-step solution** ► [prepwiser.in/questions/tajmRnJN4C](https://prepwiser.in/questions/tajmRnJN4C)

---

## Answer key — Current Electricity

Numbers match the question numbers above. For full working, open the solution link under each question.

|    |      |    |     |    |      |    |     |    |    |    |     |    |     |    |      |
|----|------|----|-----|----|------|----|-----|----|----|----|-----|----|-----|----|------|
| 1  | C    | 2  | 2   | 3  | 1027 | 4  | 748 | 5  | 16 | 6  | 5   | 7  | 4   | 8  | 32   |
| 9  | 22   | 10 | B   | 11 | D    | 12 | C   | 13 | A  | 14 | C   | 15 | 15  | 16 | D    |
| 17 | 100  | 18 | 3   | 19 | 25   | 20 | A   | 21 | A  | 22 | D   | 23 | 44  | 24 | 2    |
| 25 | B    | 26 | A   | 27 | B    | 28 | A   | 29 | B  | 30 | A   | 31 | 300 | 32 | B    |
| 33 | 20   | 34 | B   | 35 | C    | 36 | A   | 37 | 4  | 38 | 4   | 39 | C   | 40 | D    |
| 41 | D    | 42 | 5   | 43 | B    | 44 | A   | 45 | 5  | 46 | 5   | 47 | A   | 48 | A    |
| 49 | A    | 50 | 300 | 51 | C    | 52 | A   | 53 | C  | 54 | B   | 55 | A   | 56 | B    |
| 57 | B    | 58 | 25  | 59 | 5    | 60 | C   | 61 | 20 | 62 | 18  | 63 | 25  | 64 | D    |
| 65 | 12   | 66 | D   | 67 | 125  | 68 | 25  | 69 | B  | 70 | 136 | 71 | B   | 72 | 48   |
| 73 | 12   | 74 | A   | 75 | D    | 76 | B   | 77 | C  | 78 | B   | 79 | B   | 80 | 16   |
| 81 | B    | 82 | D   | 83 | 14   | 84 | C   | 85 | 15 | 86 | 450 | 87 | 4   | 88 | 3840 |
| 89 | 2500 | 90 | B   | 91 | B    | 92 | B   | 93 | D  | 94 | C   | 95 | 2   | 96 | 30   |

### Want the next chapter?

All Physics chapters, every JEE Main PYQ, free with solutions: [prepwisar.in](https://www.prepwisar.in)