Q 135

The resistance of a wire is 5 ohm at 50°C and 6 ohm at 100°C. The resistance of the wire at 0 °C will be

- 2 ohm
- 1 ohm
- **4 ohm** ✓
- 3 ohm

Q 134

The sides of rectangular block are 2 cm, 3 cm and 4 cm.The ratio of the maximum to minimum resistance between its parallel faces is

- 3
- **4** ✓
- 2
- 1

Q 133

The mobility of free electrons (charge e, mass m and relaxation time τ) in a metal is

- **$\frac{e}{m}\tau$** ✓
- $\frac{m}{e}\tau$
- $\frac{e}{m\tau}$
- $\frac{m}{e\tau}$

Q 132

When a potential difference is applied across a cylindrical wire, average drift speed of free electrons is 'V'. Now the wire is stretched to two times its original length and same potential difference is applied across it. Then the new drift speed of free electrons will be _____

- 4V
- **$\frac{V}{4}$** ✗
- $\frac{V}{2}$ ✓
- 2V

Q 131

In a wire of circular cross-section with radius 'r' free electrons travel with a drift velocity v, when a current I flows through the wire. The current in another wire of half the radius and of the same material when the drift velocity is 2v is

- 2I
- I
- I /2
- I /4

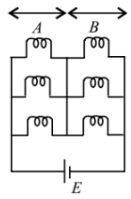
Q 130

Two electric bulbs marked 25W-220V and 100W-220V are connected in series to a 440V supply. Which of the bulbs will fuse?

- Both
- 100W
- 25W
- Neither

Q 129

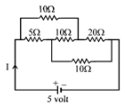
Six similar bulbs are connected as shown in the figure with a DC source of emf E, and zero internal resistance. The ratio of power consumption by the bulbs when (i) all are glowing and (ii) in the situation when two from section A and one from section B are glowing, will be



- 2 : 1
- 4 : 9
- 9 : 4
- 1 : 2

Q 128

The current I drawn from the 5 volt source will be :



- 0.17 A
- 0.33 A
- 0.5 A
- 0.67 A

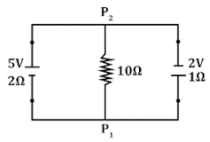
Q 127

A current of 16A is made to pass through a conductor in which the number density of free electrons is $4 \times 10^{28}\ m^{-3}$ and the area of cross-section is $10^{-5} m^2$. The average velocity of free electrons in the conductor is

- $1.6 \times 10^{-4} ms^{-1}$
- $2.5 \times 10^{-4} ms^{-1}$
- $6.4 \times 10^{-4} ms^{-1}$
- $3.2 \times 10^{-4} ms^{-1}$

Q 126

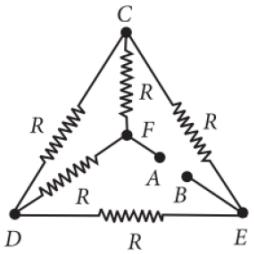
A 5V battery with internal resistance 2Ω and 2V battery with internal resistance 1Ω are connected to a 10Ω resistor as shown in figure. The current in 10Ω resistor, is



- $0.27A, P_1\ to\ P_2$
- $0.27A,\ P_2\ to\ P_1$
- $0.03A,\ P_1\ to\ P_2$
- $0.03A,\ P_2\ to\ P_1$

Q 125

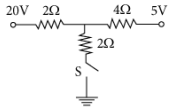
Five equal resistances, each resistance R, are connected as shown in the figure. Effective resistance between A and B is



- $\frac{R}{5}$
- $\frac{R}{2}$
- R

Q 124

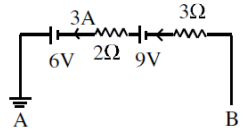
As the switch S is closed in the circuit shown in figure, current passed through it is



- 4.5 A
- 6.0 A
- 3.0 A
- Zero

Q 123

The potential difference between points A and B is



- 10V
- 12V
- 14V
- Zero

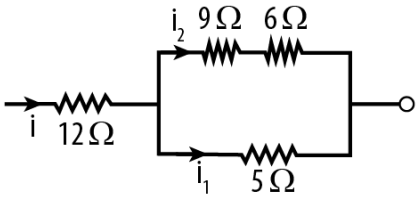
Q 122

An electric kettle has two coils. When one of these is switched on, the water in the kettle boils in 6 minutes. when the other coil is switched on, the water boils in 3 minutes. If the two coils are connected in series, the time taken to boil the water in the kettle is

- 3 minutes
- 6 minutes
- 2 minutes
- **9 minutes**

Q 121

In the following circuit, 5Ω resistor develops 45 J/s due to current flowing through it. The power developed across 12Ω resistor is



- 16 W
- **192 W**
- 36 W
- 64 W

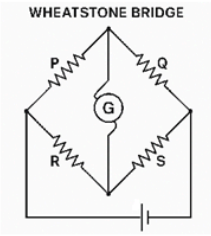
Q 120

How will you connect (series and parallel) 24 cells each of internal resistance 1 ohm so as to get maximum power output across a load of 10Ω ? [a=number of rows that are connected in parallel b=number of cells in series in each row]

- a = 6, b = 4
- a = 8, b = 3
- **a = 2, b = 12**
- a = 1, b = 24

Q 119

Resistances P, Q R, S of values 2, 3, 2, 4 ohms form a Wheatstone bridge. The resistance to be connected to S to have the bridge balanced is



- 1 ohm series
- 2 ohm series
- 12 ohm parallel
- 10 ohm parallel

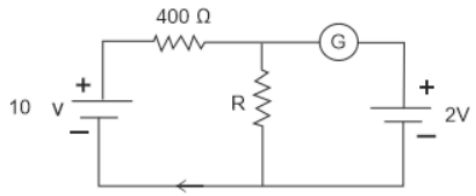
Q 118

In metre bridge experiment, the known and unknown resistances in the two gaps are interchanged. The error so removed is

- end correction
- index error
- due to temperature effect
- random error

Q 117

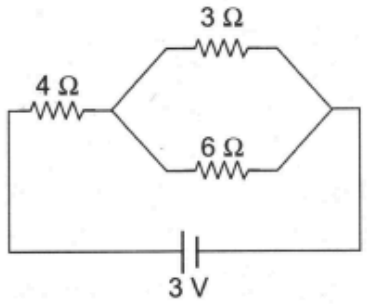
If the galvanometer G does not show any deflection in the circuit shown, the value of R is given by



- 400 ohm
- 200 ohm
- 50 ohm
- 100 ohm

Q 116

The potential drop across the $3\ \Omega$ resistor is

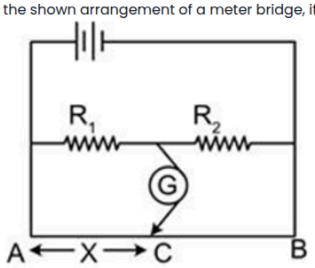


- 1 V
- 1.5 V
- 2 V
- 3 V

- x
- x/4
- 4x
- 2x

Q 115

In the shown arrangement of a meter bridge, if AC corresponding to null deflection of galvanometer is x, what would be its value if the radius of the wire AB is doubled?



Q 114

When a metal conductor connected to left gap of a metre bridge is heated, the balancing point :

- (●) Shifts towards right
- ( ) Shifts towards left
- ( ) Remains unchanged
- ( ) Remains at zero

Q 113

When an unknown resistance and a resistance of 6Ω are connected in the left and right gaps of a meter bridge, the balancing point is obtained at 50 cm. If a 3Ω resistance is connected in parallel to resistance in the right gap, the balance length becomes

- ( ) 75 cm
- ( ) 25 cm
- ( ) 60 cm
- ( ) 83.7 cm

Q 112

The potential difference between points A and B is

- ( ) 0 V
- ( ) 10 V
- ( ) 4 V
- ( ) 5 V

Q 111

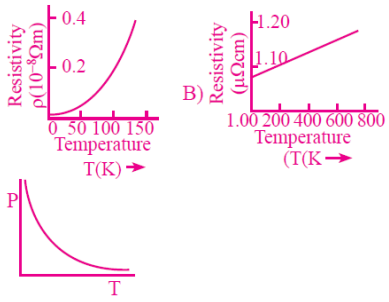
Resistivity of a conductor depends on

- length and area of cross-section
- length and nature of the material of the conductor
- area of cross-section and temperature
- temperature and material of the conductor

- C,A,B
- A, B,C
- C,A,D
- B,A,C

Q 110

Which of the following graph shows variation of Resistivity of copper, nicrome and semiconductor with temperature respectively are



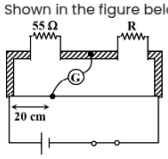
Q 109

On increasing the temperature of a conductor, its resistance increases because

- rate of collision increases
- mass of the electron increases
- electron density decrease
- none of the above

Q 108

Shown in the figure below is a meter-bridge set up with null deflection in the galvanometer.



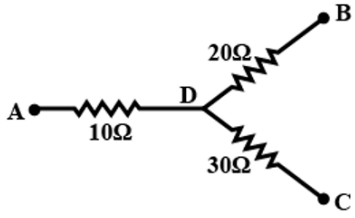
The value of the unknown resistor R is

- 13.75 Ω
- 220 Ω
- 110 Ω
- 55 Ω

- The point D will be at a potential of 60V
- The point D will be at a potential of 20V
- Currents in the paths AD, DB and DC are in the ratio of 1 : 2 : 3
- Currents in the paths AD, DB and DC are in the ratio of 3 : 2 : 1

Q 107

In the circuit given here, the points A, B and C are 70V, zero, 10V respectively then



Q 106

Assertion (A): However long a fuse wire may be, the safe current that can be allowed is the same through it.
Reason (R): The safe current that can be allowed to pass through a fuse wire depends on the radius of wire.

- Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
- Both 'A' and 'R' are true and 'R' is not the correct explanation of 'A'
- 'A' is true and 'R' is false
- 'A' is false and 'R' is false

Q 105

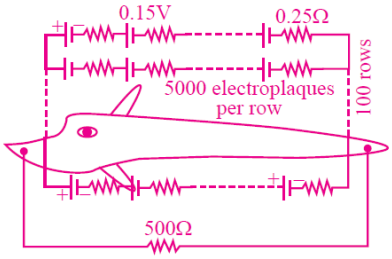
(A): Wheatstone Bridge provides practical method for determination of an unknown resistance.
(R): The error in measuring the unknown resistance is minimum in meter bridge experiment, if the balance point is close to 50 cm.

- Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
- Both 'A' and 'R' are true and 'R' is not the correct explanation of 'A'
- 'A' is true and 'R' is false
- 'A' is false and 'R' is false

- 1.5A
- 3.0A
- 15A
- 30A

Q 104

Eels are able to generate current with biological cells called electro plaques. The electroplaques in an eel are arranged in 100 rows, each row stretching horizontally along the body of the fish containing 5000 electroplaques. The arrangement is suggestively shown here. Each electroplaques has an emf of 0.15V and internal resistance of 0.25Ω . The water surrounding the eel completes a circuit between the head and its tail. If the water surrounding it has a resistance of 500Ω, the current an eel can produce in water is about



Q 103

When an unknown resistance and a resistance of 4Ω are used in the left and right gaps of a metre bridge, the balancing point is 50 cm. Find the shift in the balance point if a 4Ω resistor is now connected parallel to the resistor in right gap

- $\frac{100}{3}\ cm$
- $\frac{200}{3}\ cm$
- $\frac{50}{3}\ cm$
- $\frac{400}{3}\ cm$

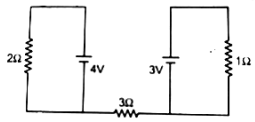
Q 102

Five identical cells each of internal resistance 1Ω 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 ?

- ◉ 1 Ω
- ○ 25 Ω
- ○ 5 Ω
- ○ 10 Ω

Q 101

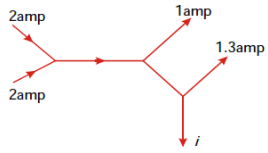
The potential difference across the $3\,\Omega$ resistor as shown in figure is



- ◉ Zero
- ○ 1 V
- ○ 3.5 V
- ○ 7 V

Q 100

The figure below shows current in a part of electric circuit. The current i is



- ○ 1.3 A
- ○ 3.7 A
- ◉ 1.7 A
- ○ 1 A

Q 99

A battery of emf 10 V and internal resistance 0.5 ohm is connected across a variable resistance R. The value of R for which the power delivered in it is maximum is given by :

- 2.0Ω
- 0.25Ω (selected)
- 1.0Ω
- 0.5Ω (correct)

Q 98

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

- 50 W
- 10 W
- 12.5 W (selected, correct)
- 25 W

Q 97

An aluminium $(\alpha_{Al} = 4 \times 10^{-3}/^{\circ}C)$ wire resistance "R_1" and carbon wire $(\alpha_c = 0.5 \times 10^{-3}/^{\circ}C)$ resistance "R_2" are connected in series to have a resultant resistance of 18 ohm at all temperatures. The values of R_1 and R_2 in ohms

- 2,16 (correct)
- 12 ,6
- 13,5
- 14, 4

Q 96

If an electron revolves in the circular path of radius $0.5\overset{0}{A}$ at a frequency of 5×10^{15} cycles/sec. The equivalent electric current is

- 0.4 mA
- 0.8 mA (selected, correct)
- 1.2 mA
- 1.6 mA

Q 95

The effective resistance of a number of resistors in parallel is $x\ \Omega$. When one of the resistors is burnt, the effective resistance in $y\ \Omega$. The resistance of the burnt resistor is.

- $\left(\frac{xy}{x+y}\right)\Omega$
- $(x-y)\,\Omega$
- $\left(\frac{x+y}{xy}\right)\Omega$
- ✓ $\left(\frac{xy}{y-x}\right)\Omega$

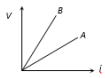
Q 94

A current of 4.8 A is flowing in a conductor. The number of electrons flowing per second through the conductor will be

- ✓ 3×10^{19} electrons/sec
- 76.8×10^{20} electrons/sec
- 7.68×10^{20} electron/sec
- 3×10^{20} electrons/sec

Q 93

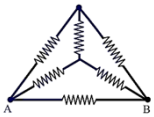
V-i graphs for parallel and series combination of two identical resistors are as shown in figure. Which graph represents a parallel combination?



- ✓ A
- B
- A and B both
- Neither A nor B

Q 92

A wire of resistance R is bent into a triangular pyramid as shown in figure with each segment having same length. The resistance between points A and B is R/n. The value of n is :



- 16
- 14
- 10
- 12

Q 91

Drift speed of electrons, when 1.5 A of current flows in a copper wire of cross-sectional area ($5\,\mathrm{mm}^2$) is v. If the electron density of copper is $9 \times 10^{28}/\mathrm{m}^3$ the value of v in mm/s is close to (charge of electron $= -1.6 \times 10^{-19} C$)

- 3
- 0.2
- 2
- 0.02