PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

CURRENT ELECTRICITY

In Text Solved Examples

1. Compute the current in the wire if a charge of 120 C is flowing through a copper wire in 1

minute.

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2. If a electric field of magnitude 570 N C^{-1}, is applied in the copper wire. find the acceleration experienced by the electron.

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3. A copper wire of cross-sectional area 0.5 mm^2 carries a current of 0.2A. If the free

electron density of copper is $8.4 \times 10^{28} m^{-3}$ then compute the drift velocity of free electrons.

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4. Determine the number of electrons flowing per second through a conductor, when a current of 32A flows through it.

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5. A potential difference across 24Ω resistor is 12 V. What is the current through the resistor?

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6. The resistance of a wire is 20Ω. What will be new resistance, if it is stretched uniformly 8 times its original length?

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7. Consider a rectangular block of metal of height A, width B and length C as shown in the figure.

If a potential difference of V is applied between the two faces A and B of the block (figure (a)), the current I_{AB} is observed. Find the current that flows if the same potential difference V is applied between the two faces B and C of the block (figure(b)). Give your answers in terms of I_{AB}.

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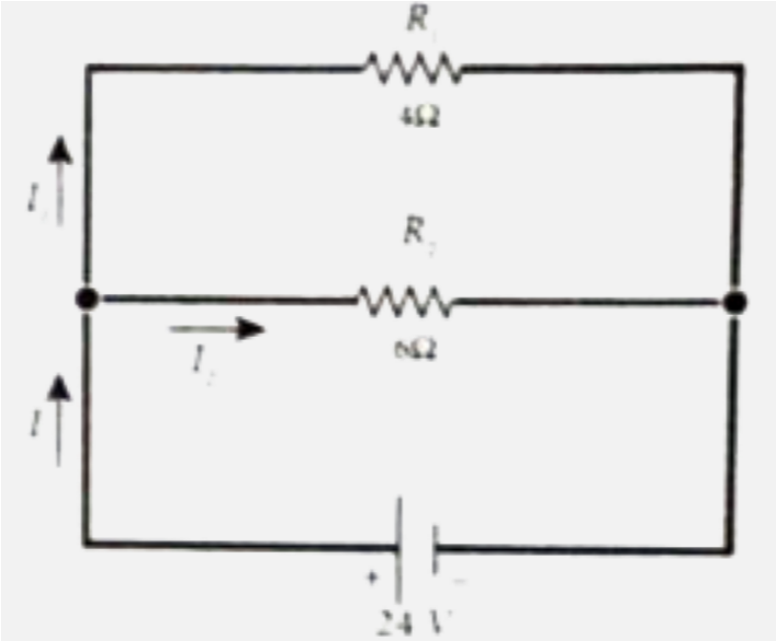
8. Calculate the equivalent resistance in the following circuit and also find the current I, I_1 and I_2 in the given circuit.



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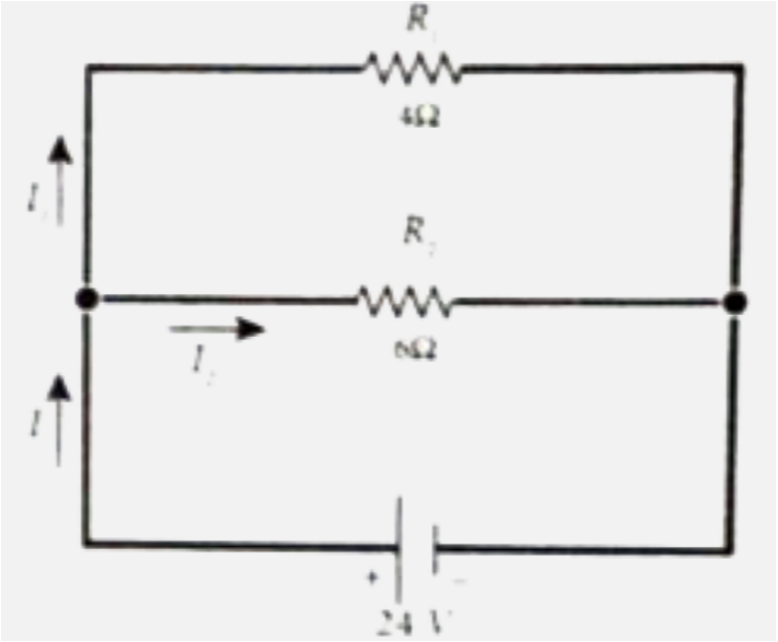
9. Calculate the equivalent resistance in the following circuit and also find the current I, I_1 and I_2 in the given circuit.



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10. When two resistances connected in series and parallel their equivalent resistances are 15Ω and $\frac{56}{15}\Omega$ respectively. Find the individual resistances.

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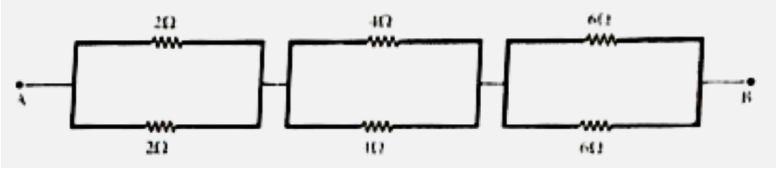
11. Calculate the equivalent resistance betweeen A and B in the given circuit.



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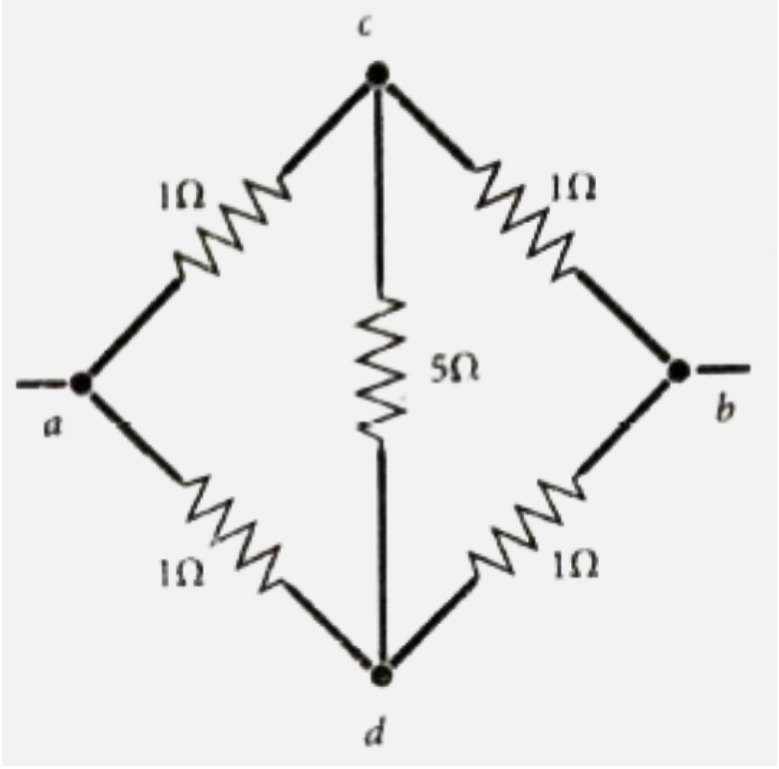
12. Five resistors are connected in the configuration as shown in the figure. Calculate the equivalent resistance between the points a and b.



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13. If the resistance of coil is 3Ω at $20^\circ C$ and $\alpha = 0.004/^\circ C$ then determine its resistance t $100^\circ C$.

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14. Resistance of a material at $10^\circ C$ and $40^\circ C$ are 45Ω and 85Ω respectively. Find its temperature co-efficient of resistance

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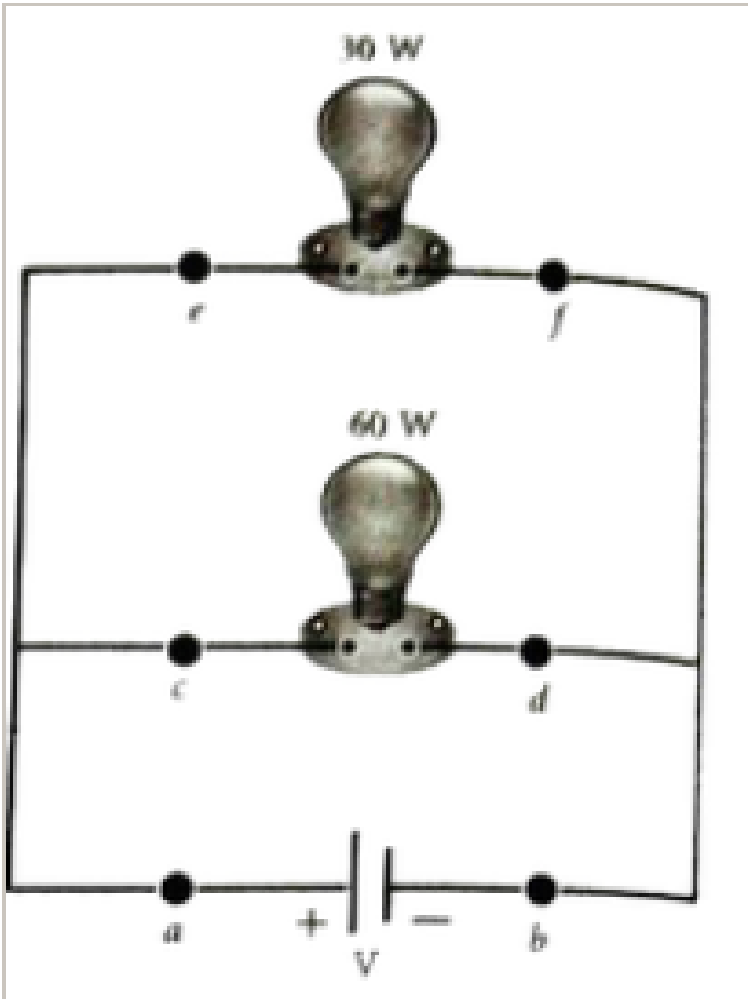
15. A battery of voltage V is connected to 30V bulb and 60 W bulb as shown in the figure. (a) Identify brightest bulb (b) which bulb has greater resistance? (c) Suppose the two bulbs are connected in series, which bulb will glow

brighter?



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16. Two electric bulbs marked 20 W- 220 V and 100 W - 220 V are connected in series to 440 V supply. Which bulb will be fused?

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17. A battery has an emf of 12 V and connected to a resistor of 3Ω. The current in the circuit is 3.93 A. Calculate (a) terminal voltage and the internal resistance of the battery (b) power

delivered by the battery and power delivered to the resistor.

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18. From the given circuit,

Find

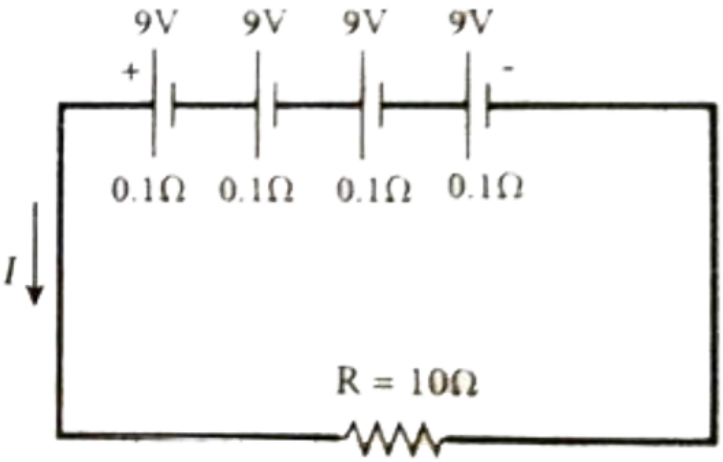
(i) Equivalent emf of the combination

(ii) Equivalent internal resistance

(iii) Total current

(iv) Potential difference across external resistance

(v) Potential difference across each cell



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19. From the given circuit

Find

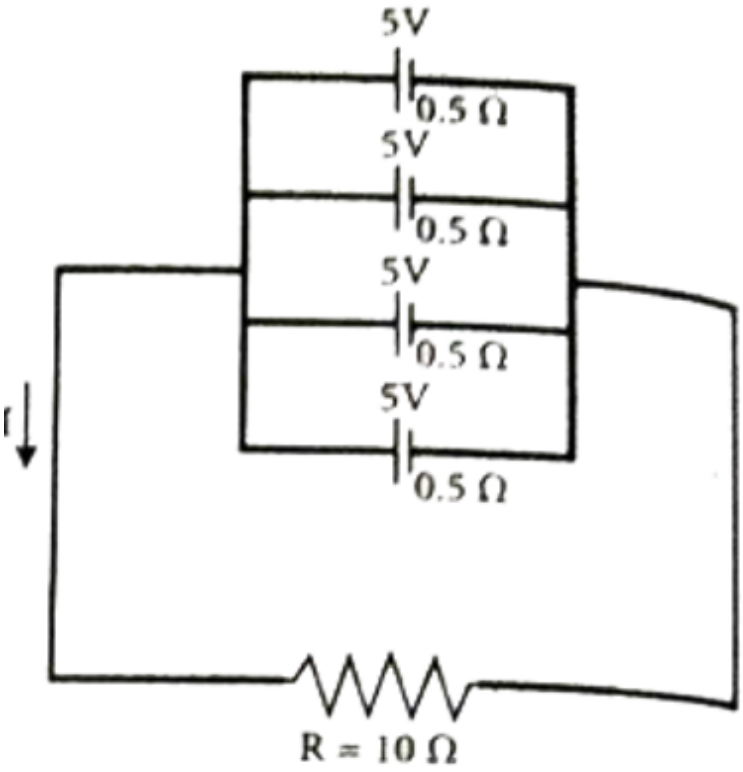
(i) Equivalent emf

(ii) Equivalent internal resistance

(iii) Total current (I)

(iv) Potential difference across each cell

(v) Current from each cell



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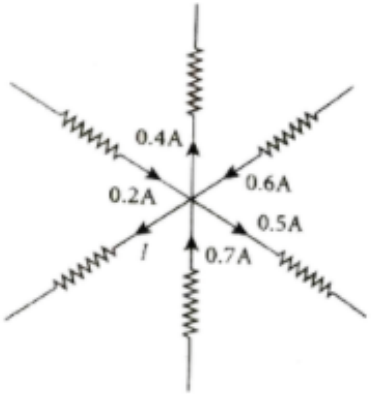
20. From the given circuit find the value of I.



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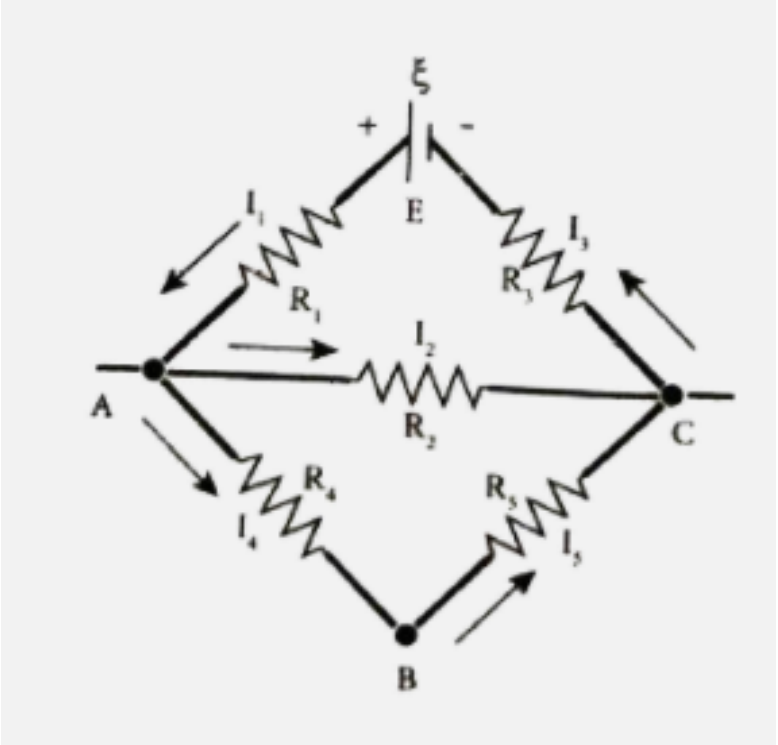
21. The following figure shows a complex network of conductors which can be divided into two closed loops like ACE and ABC. Apply

Kirchoff's voltage rule.



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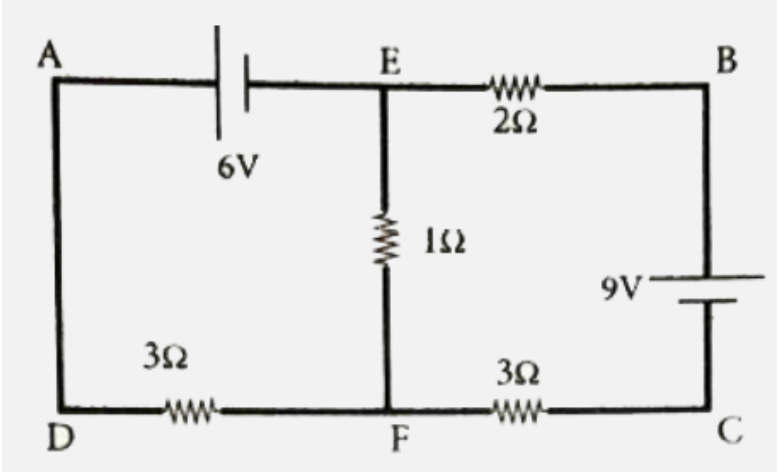
22. Calculate the current that flows in the 1Ω resistor in the following circuit.



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23. In a Wheatstone's bridge $P = 100\Omega, Q = 1000\Omega$ and $R = 40\Omega$. If the galvanometer shows zero deflection, determine the value of S.

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24. What is the value of x when the Wheatstone's network is balanced?

$P = 500\Omega, Q = 800\Omega, R = x + 400, S = 1000\Omega$

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25. In a meter bridge with a standard resistance of 15Ω in the right gap, the ratio of balancing length is $3:2$. Find the value of the other resistance.

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26. In a meter bridge, the value of resistance in the resistance box is 10Ω. The balancing length is $l_1 = 55cm$. Find the value of dunknown resistance.

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27. Find the heat energy produced in a resistance of 10Ω when 5 A current flows through it for 5 minutes.

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28. An electric heater of resistance 10Ω connected to 220 V power supply is immersed in the water of 1 kg. How long the electrical heater has to be switched on to increase its temperature from $30^\circ C$ to $60^\circ C$. (The specific heat of water is $s = 4200 Jkg^{-1}/C^\circ$)

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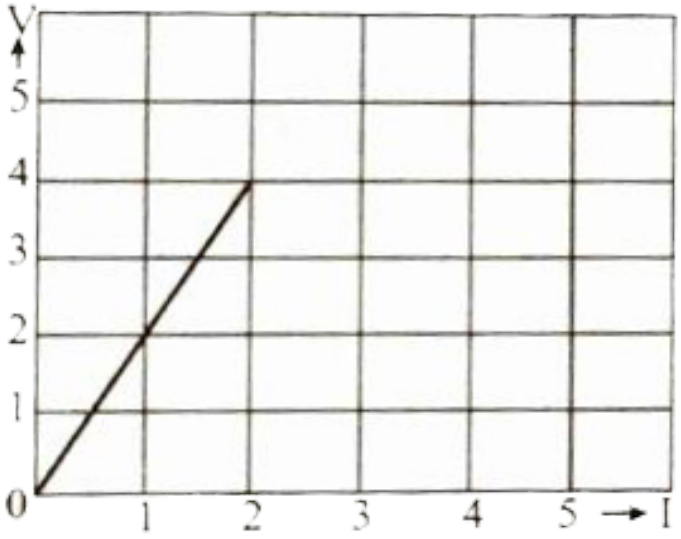
Textbook Evaluation Choose The Correct Answer

1. The following graph shows current versus voltage values of some unknown conductor. What is the resistance of this conductor?



A. 2 ohm

B. 4 ohm

C. 8 ohm

D. 1 ohm

Answer: A

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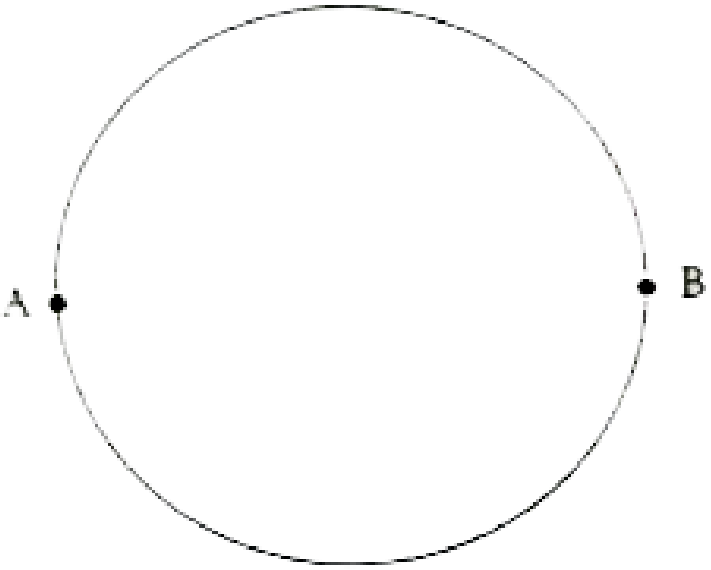
2. A wire of resistance 2 ohms per meter is bent to form a circle of radius 1 m. The equivalent resistance between its two diameterically opposite points, A and B as

shown in the figure is .....



A. $\pi\Omega$

B. $\frac{\pi}{2}\Omega$

C. $2\pi\Omega$

D. $\frac{\pi}{4}\Omega$

Answer: B

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3. A toaster operating at 240 V has a resistance of 120Ω. The power is ..... .

A. 400 W

B. 2 W

C. 480 W

D. 240 W

Answer: C

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4. A carbon resistor of $(47 \pm 4.7)k\Omega$ to be marked with rings of different colours for its identification. The colour code sequence will be

A. Yellow - Green - Violet - Gold

B. Yellow - Violet - Orange - Silver

C. Violet - Yellow - Orange - Silver

D. Green - Orange - Violet - Gold

Answer: B

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5. What is the value of resistance of the following resistor?

A. $100k\Omega$

B. $10k\Omega$

C. $1k\Omega$

D. $1000k\Omega$

Answer: A

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6. Two wires of A and B with cirular cross section made up of the same material with equal lengths.Suppose $R_A = 3R_B$, then what is the ratio of radius of wire A to that of B ?

A. a) 3

B. $\sqrt{3}$

C. $\frac{1}{\sqrt{3}}$

D. $\frac{1}{3}$

Answer: C

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7. A wire connected to a power supply of 230V has power dissipation P_1. Suppose the wire is cut into two equal pieces and connected

parallel to the same power supply. In this case power dissipation is P_2. The ration $\frac{P_2}{P_1}$ is.

A. a) 1

B. b) 2

C. c) 3

D. d) 4

Answer: D

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8. In India electricity is supplied for domestic use at 220V. It is supplied at 110V in USA. If the resistance of a 60W bulb for use in India is R, the resistance of a 60W bulb for use in USA will be ..... .

A. R

B. 2R

C. $\frac{R}{4}$

D. $\frac{R}{2}$

Answer: C

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9. In a large building, there are 15 bulbs of 40W, 5 bulbs of 100W, 5 fans of 80W and 1 heater of 1 kW are connected. The voltage of electric mains is 220V. The minimum capacity of the main fuse of the building will be ..... .

A. 14A

B. 8A

C. 10A

D. 12A

Answer: D

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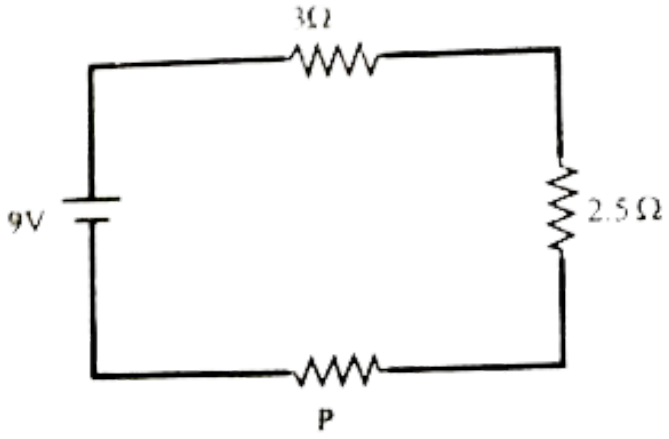
10. There is a current of 1.0A in the circuit shown below. What is the resistance of P?



A. 1.5Ω

B. 2.5Ω

C. 3.5Ω

D. 4.5Ω

Answer: C

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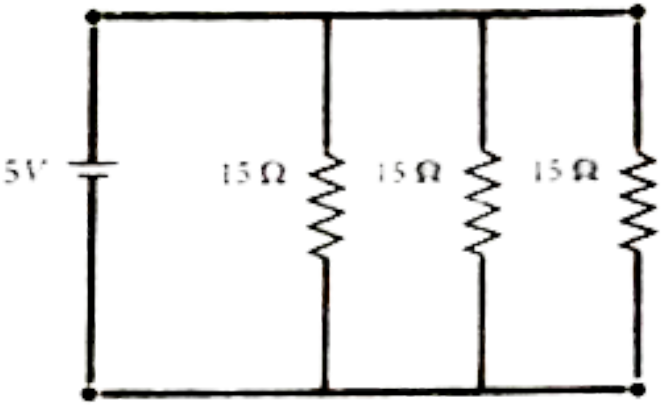
11. What is the current out of the battery ?



A. 1A

B. 2A

C. 3A

D. 4A

Answer: A

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12. The temperature coefficient of resistance of a wire is 0.00125 per $^{\circ}C$. At 300 K, its resistance is 1Ω. The resistance of the wire will be 2Ω at ..... .

A. 1154 K

B. 1100 K

C. 1400 K

D. 1127 K

Answer: D

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13. The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10Ω is ..... .

A. 0.2Ω

B. 0.5Ω

C. 0.8Ω

D. 1.0Ω

Answer: B

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14. A piece of copper and another of germanium are cooled from room temperature to 80K. The resistance of .....

.

A. each of them increase

B. each of them decreases

C. copper increases and germanium decreases

D. copper decreases and germanium increases

Answer: D

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15. In Joule's heating law, when R and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is ..... .

A. straight line

B. parabola

C. circle

D. ellipse

Answer: A

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Textbook Evaluation Short Answer Questions

1. Why current is a scalar?

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2. Distinguish between drift velocity and mobility.

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3. State macroscopic form of Ohm's law.

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4. State macroscopic form of Ohm's law.

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5. What are ohmic and non ohmic devices ?

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6. Define electrical resistivity.

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7. Define temperature coefficient or resistance.

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8. What is superconductivity ?

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9. What is electric power and electric energy ?

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10. Define current density.

Watch Video Solution

11. Derive the expression for power $P = Vi$ in electrical circuit.

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12. Write down the various forms of expression for power in electrical circuit.

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13. State Kirchhoff's current rule.

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14. Sate Kirchhoff's voltage rule.

Watch Video Solution

15. State the principle of potentiometer.

Watch Video Solution

16. What do you mean by internal resistance of a cell ?

Watch Video Solution

17. State Joule's law of heating.

Watch Video Solution

18. What is Seeback effect ?

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19. What is thomson effect ?

Watch Video Solution

20. What is Peltier effect ?

Watch Video Solution

21. Sate the applications of Seeback effect.

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Textbook Evaluation Long Answer Questions

1. Describe the microscopic model of current and obtain general from of Ohm's law.

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2. Obtain the macrscopic form of Ohm's law form its microscopic form and discuss its limitation.

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3. Explain the equivalent resistance of a series and parallel resistor network.

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4. Explain the determination of the internal resistance of a cell using voltmeter.

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5. State and explain Kirchhoff's rules.

Watch Video Solution

6. Obtain the condition for bridge balance in Wheatstone's bridge.

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7. Explain the determination of unknown resistance using meter bridge.

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8. How the emf of two cells are compared using potentiometer ?

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Textbook Evaluation Numerical Problems

1. The following graphs represent the current versus voltage and voltage versus current for the six conductors A,B,C,D,E and F. Which conductor has least resistance and which has maximum resistance?

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2. Lightning is very good example of natural current. In typical lightning, there is $10^9 J$ energy transfer across the potential difference of $5 \times 10^7 V$ during a time interval of 0.2s.

Using this information, estimate the following quantities (a) total amount of charge transferred between bolt (c) the power delivered in 0.2 s.

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3. A copper wire of $10^{-6}m^2$ are of cross section, carries a current of 2A. If the number of electrons per cubic meter is 8×10^{28}, calculate the current density and average drift velocity.

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4. The resistance of a nichrome wire at $0^{\circ}C$ is 10Ω. If its temperature coefficient of

resistance is $0.004/^{\circ}C$ find its resistance at boiling point of water. Comment on the result.

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5. The rod given in the figure is made up of two different materials.

Both have square cross sections of 3 mm side. The resistivity of the first material is $4 \times 10^{-3} \Omega . m$ and it is 25 cm long while second material has resistivity of

$5 \times 10^{-3} \Omega . m$ and is of 70 cm long. What is the resistivity of rod between its ends?

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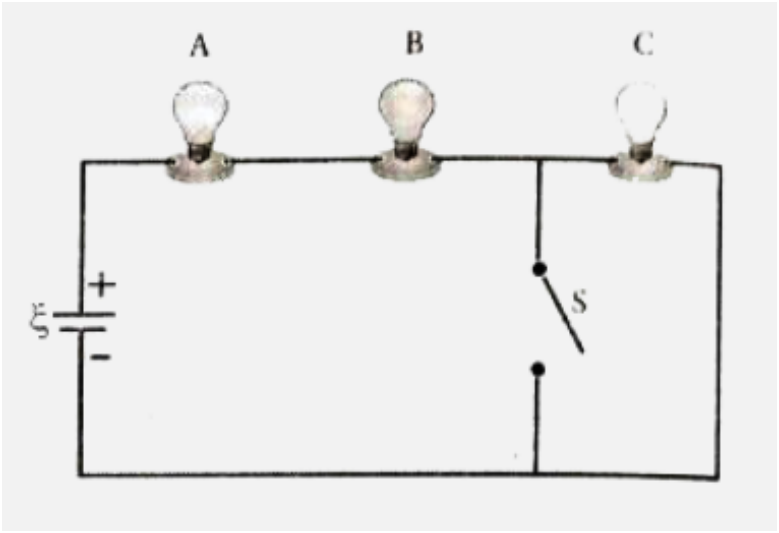
6. Three identical lamps each having a resistance R are connected to the battery of emf as shown in the figure.



Suddenly the switch S is closed. (a) Calculate the current in the circuit when S is open and closed (b) What happens to the intensities of the bulbs A,B and C. (c) Calculate the voltage across the three bulbs when S is open and closed (d) Calculate the power delivered to the circuit when S is opened and closed (e) Does the power delivered to the circuit decreases, increases or remain same?

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7. The current through an element is shown in the figure. Determine the total charge that pass through the element at a) t= 0s, b) t = 2s, c) t = 5s

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8. An element hobbyist is building a radio which reequires 150Ω in her circuit, but she has only $220\Omega, 79\Omega$ and 92Ω resistors

available. How can she connect the available resistor to get desired value of resistance ?

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9. A cell supplies a current of 0.9 A through a 1Ω resistor and a current of 0.3 A through a 2Ω resistor. Calculate the internal resistance of the cell.

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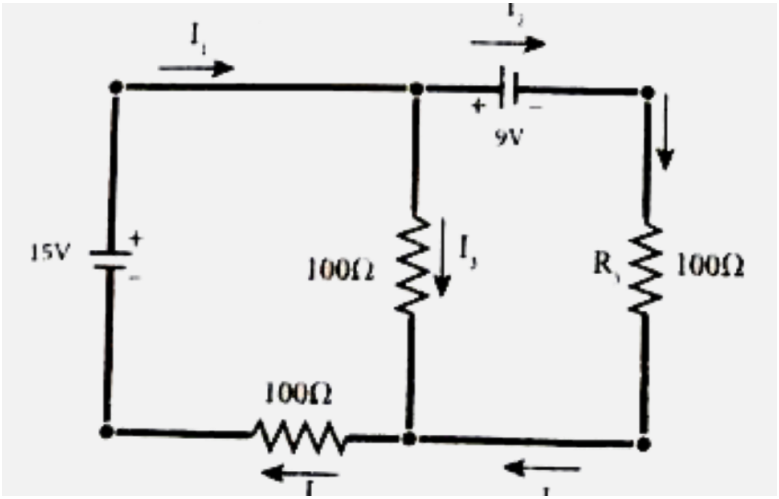
10. Calculate the currents in the following circuit.



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11. A potentiometer wiere has a length of 4 and resistance of 20Ω. It is connected in series

with resistance of 2980Ω and a cell of emf 4 V.

Calcaulte the potential along the wire.

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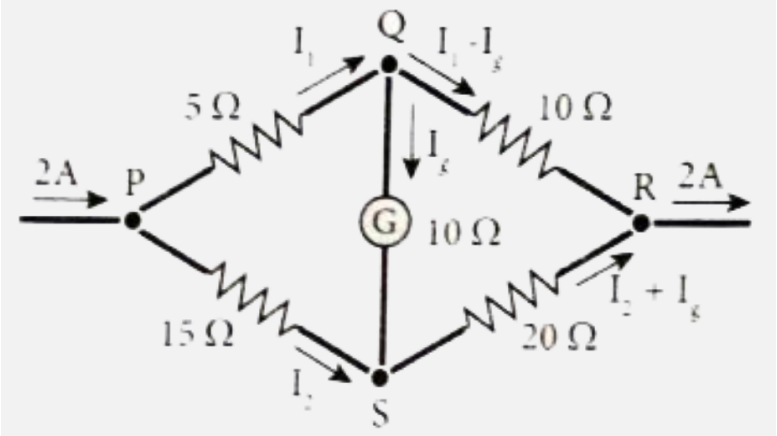
12. Determine the current flowing through the galvanometer (G) as shown in the figure.



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13. Two cells each of 5V are connected in series across a 8Ω resistor and three parallel resistors of $4\Omega, 6\Omega \text{ and } 12\Omega$. Draw a circuit diagram for the above arrangement. Calculate (i) the current drawn fron the cell (ii) current through each resistor.

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14. Four light bulbs P, Q, R, S are connected in a circuit of unknown arrangement. When each

bulb is removed one at a time and replaced, the following behavior is observed.

	P	Q	R	S
P removed	*	on	on	on
Q removed	on	*	on	off
R removed	off	off	*	off
S removed	on	off	on	*

Draw the circuit diagram for these bulbs.

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15. In a potentiometer arrangement a cell of emf 1.25 V givesn a balance point at 35 cm length of the wire. If the cell is replaced by

another cell and the balance point shift to 63 cm, what is the emf of the second cell ?

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Additional Questions Solved Choose The Correct Answer

1. When current I flows through a wire, the drift velocity of the electrons is v. When current 2I flows through another wire of the same material having double the length and

area of cross-section, the drift velocity of the electrons will be

A. $\frac{v}{4}$

B. $\frac{v}{2}$

C. v

D. 2v

Answer: C

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2. A copper wire of length 2 m and area of cross-section $1.7 \times 10^{-6} m^2$ has a resistance of $2 \times 10^{-2} \Omega$. The resistivity of copper is

A. $1.7 \times 10^{-8} \Omega m$

B. $1.9 \times 10^{-8} \Omega m$

C. $2.1 \times 10^{-7} \Omega m$

D. $2.3 \times 10^{-7} \Omega m$

Answer: A

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3. If the length of a wire is doubled and its cross-section is also doubled, then its resistance will

A. become 4 times

B. become 1/4

C. becomes 2 times

D. remain unchanged

Answer: D

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4. A 10 m long wire of resistance 20Ω is connected in series with a battery of emf 3V and a resistance of 10Ω. The potential gradient along the wire in volt per metre is

A. 0.02

B. 0.1

C. 0.2

D. 1.2

Answer: C

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5. The resistivity of a wire

A. varies with its length

B. varies with its mass

C. varies with its cross-section

D. does not depend on its length, cross-section and mass.

Answer: D

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6. The electric intensity E, current density 'j' and conductivity σ are related as

A. $j = \sigma E$

B. $j = \frac{E}{\sigma}$

C. $jE = s$

D. $j = \sigma^2 s$

Answer: A

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7. For which of the following dependences of drift velocity v_d on electric field E, is Ohm's law obeyed?

A. $v_d \propto E$

B. $v_d \propto E^2$

C. $v_d \propto \sqrt{E}$

D. $v_d =$ constant

Answer: A

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8. A cell has an emf of 1.5V. When short circuited, it gives a current of 3A. The internal resistance of the cell is

A. 0.5Ω

B. 2.0Ω

C. 4.5Ω

D. $\frac{1}{4.5}\Omega$

Answer: A

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9. Three resistance, each of 1Ω, are joined in parallel. Three such combinations are put in series. The resultant resistance is

A. 9Ω

B. 3Ω

C. 1Ω

D. $\frac{1}{3}\Omega$

Answer: C

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10. Constantan is used for making standard resistance because it has

A. high resistivity

B. low resistivity

C. negligible temperature coefficient of resistance

D. high melting point

Answer: C

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11. Kirchhoff's two laws for electrical circuits are magnifestations of the conservation of

A. charge only

B. both energy and momentum

C. energy only

D. both charge and energy

Answer: D

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12. The resistance R_o and R_t of a metallic wire at temperature $0^\circ C$ and $t^\circ C$ are related as (α is the temperature co-efficient of resistance).

A. $R_t = R_o(1 + \alpha t)$

B. $R_t = R_o(1 - \alpha t)$

C. $R_t = R_o(1 + \alpha t)^2$

D. $R_t = R_o(1 - \alpha t)^2$

Answer: A

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13. A cell of emf 2V and internal resistance 0.1 Ω is connected with a resistance of 3.9Ω . The voltage across the cell terminals will be

A. a) 0.5 V

B. b) 1.9 V

C. c) 1.95 V

D. d) 2 V

Answer: C

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14. A flow of 10^7 electrons per second in a conduction wire constitutes a current of

A. a) $1.6 \times 10^{-26} A$

B. b) $1.6 \times 10^{12} A$

C. c) $1.6 \times 10^{-12} A$

D. d) $1.6 \times 10^{26} A$

Answer: C

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15. Sensitivity of a potentiometer can be increased by

A. increasing the emf of the cell

B. increasing the length of the wire

C. decreasing the length of the wire

D. none of the above

Answer: B

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16. Potential gradient is defined as

A. fall of potential per unit length of the wire

B. fall of potential per unit area of the wire

C. fall of potential between two ends of the wire.

D. none of the above

Answer: A

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17. n equal resistors are first connected in series and then in parallel. The ratio of the equivalent resistance in two cases is

A. n

B. $\frac{1}{n^2}$

C. n^2

D. $\frac{1}{n}$

Answer: C

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18. A galvanometer can be converted into a voltmeter by connecting

A. high resistance is series

B. high resistance in parallel

C. low resistance in series

D. low resistance in parallel

Answer: D

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19. The reciprocal of resistance is .....

.

A. conductance

B. resistivity

C. conductivity

D. none of the above

Answer: A

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20. A student has 10 resistors, each of resistance r. The minimum resistance that can be obtained by him using these resistors is

A. 10r

B. $\frac{r}{10}$

C. $\frac{r}{100}$

D. $\frac{r}{5}$

Answer: B

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21. The drift velocity of electrons in a wire of radius r is proportional to

A. r

B. r^2

C. r^3

D. none of the above

Answer: D

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22. Kirchoff'slaw i.e., $\sum i = 0$, at a junction, deals with the conservation of

A. charge

B. energy

C. momentum

D. angular momentum

Answer: A

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23. The resistance of a material increases with temperature. It is a

A. metal

B. insulator

C. semiconductor

D. semi-metal

Answer: A

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24. Five cells, each of emf E, are joined in parallel. The total emf of the combination is

A. 5E

B. $\frac{E}{5}$

C. E

D. $\frac{5E}{2}$

Answer: C

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25. A carbon resistance has colour bands in order yellow, brown, red. Its resistance is

A. 42Ω

B. $41 \times 10^2\Omega$

C. $4 \times 10^3\Omega$

D. 4.2Ω

Answer: B

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26. What is the value of conductivity of a semiconductor at absolute zero ?

A. infinite

B. very large

C. very small

D. zero

Answer: A

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27. Explain the determination of the internal resistance of the cell using voltmeter.

A. zero

B. very low

C. very low

D. infinite

Answer: D

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28. Carriers of electric current in superconductors are

A. electrons

B. photons

C. holes

D. phonons

Answer: C

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29. A. Potentiometer measures the potential difference more accurately than a voltmeter, because the potentiometer

a. does not draw current from external circuit.

b. has a wire of high resistance.

c. draws a heavy current from external circuit.

d. has a wire of low resistance.

B. With the help of a diagram explain the principle of a potentiometer.

A. It measure potential in the open circuit.

B. It uses sensitive galvanometer for null detection.

C. It uses high resistance potentiometer wire

D. It measures potential in the closed circuit.

Answer: A

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30. What is meant by electromotive force ?

A. electric field

B. magnetic field

C. potential difference

D. mechanical force

Answer: C

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31. The capacitance of a pure capacitor is 1 farad. In DC circuit, the effective resistance will be

A. zero

B. infinite

C. 1Ω

D. 0.5Ω

Answer: B

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32. The resistance of an ideal ammeter is _____ .

A. zero

B. small

C. high

D. infinite

Answer: A

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33. A milliammeter of range 10 mA has a coil of resistance 1Ω. To use it as a voltmeter of range 10 V, the resistance that must be connected in series with it is

A. 999Ω

B. 1000Ω

C. 9Ω

D. 99Ω

Answer: A

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34. A battery of emf 10 V and internal resistance 3Ω is connected to a resistor. The current in the circuit is 0.5A. The terminal voltage of the battery when the circuit is closed is

A. 10 V

B. zero

C. 8.5 V

D. 1.5 V

Answer: C

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35. Good resistance coils are made of

A. copper

B. manganin

C. iron

D. aluminium

Answer: B

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36. A wire of resistance R is stretched to three times its original length. The new resistance is

A. 3R

B. 9R

C. $R/3$

D. $R/9$

Answer: B

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37. n resistances, each of $r\Omega$, when connected in parallel give an equivalent resistance of R Ω. If these resistances were connected in series, the combination would have a resistance in homs equal to

A. n^2R

B. $\frac{R}{n^2}$

C. $\frac{R}{n}$

D. nR

Answer: A

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38. When a wire of uniform cross-section, having resistance R, is bent into a complete circle, the resistance between any two of diametrically opposite points will be

A. $\frac{R}{8}$

B. $\frac{R}{2}$

C. 4R

D. $\frac{R}{4}$

Answer: D

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39. A steady current is set up in a metallic wire of non uniform cross-section. How is the rate of flow K of electrons related to the area of cross-section A?

A. K is independent of A

B. $K \propto A$

C. $K \propto A^{-1}$

D. $K \propto A^2$

Answer: C

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40. Ohm's Law is not obeyed by

A. electrolytes

B. discharge tubes

C. vacuum tubes

D. all of these

Answer: D

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41. Which of the following has negative temperature coefficient of resistance?

A. Copper

B. Aluminium

C. Germanium

D. Iron

Answer: C

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Additional Questions Solved Fill In The Blanks

1. The material through which electric charge can flow easily is ..... .

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2. A toaster operating at 240 V has a resistance of 120Ω. The power is ..... .

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3. In the case of insulators, as the temperature decreases, resistivity ..... .

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4. When n resistors of equal resistance (R) are connected in series, the effective resistance is ..... .

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5. The net flow of charge at any point in the conductor is ..... .

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6. The flow of free electrons in a conductor constitutes ..... .

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7. The rate of flow of charge through any wire is called ..... .

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8. The drift velocity acquired per unit electric field is the ..... .

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9. The reciprocal of resistance is ..... .

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10. The unit of specific resistance is _____.

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11. The reciprocal of electrical resistivity is called ..... .

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12. With increase in temperature the resistivity of metals ..... .

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13. The specific resistance for the insulators is in the range of _____

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14. The resistivity of semiconductors is of the order of ..... .

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15. The materials which conduct electricity at zero resistance are called ..... .

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16. Conductors turn into superconductors at ..... .

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17. The resistance of superconductors is ..... .

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18. The phenomenon of superconductivity was discovered by ..... .

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19. Mercury becomes a superconductor at ..... .

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20. With increase of temperature, resistance of conductors ..... .

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21. In insulators and semiconductors, as temperature increases, resistance ..... .

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22. A material with a negative temperature coefficient is called a ..... .

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23. the temperature co-efficient of resistance for alloys is

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24. The electric current in an external circuit flows from the ..... .

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25. In the electrolytic cell, current flows from ..... .

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26. A freshly prepared cell has ..... internal resistance.

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27. State the sign convention for applying Kirchhoff's first rule.

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28. The current law states that the algebraic sum of the currents meeting at any junction in a circuit is ..... .

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29. Current law is a consequence of conservation of ..... .

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30. Sate Kirchhoff's voltage rule.

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31. Kirchhoff's second law is a consequence of conservation of ..... .

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32. Wheatstone bridge is used for ..... .

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33. ..... is a form of Wheatstone's bridge.

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34. The temperature coefficient of manganin wire is ..... .

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35. Name the instrument which is used to measure potential difference.

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36. The SI unit of electrical energy is _____.

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37. An instrument to measure electrical power consumed is ..... .

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38. ..... first introduced the electrochemical battery

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39. Charging is a process of reproducing ..... .

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Additional Questions Solved Match The Following

1.

(i) Current	$(a) V_d = a\tau$
(ii) Drift velocity	$(b) I = \frac{Q}{t}$
(iii) Current density	$(c) V = IR$
(iv) Ohm's Law	$(d) J = \frac{I}{A}$

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2.

(i) Insulator	(a) Glass
(ii) Semiconductor	(b) Germanium
(iii) Conductor	(c) Copper
(iv) Super conductor	(d) Mercury

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3.

(i) Current	(a) watt
(ii) Current density	(b) ms^{-1}
(iii) Drift velocity	(c) ampere metre^{-2}
(iv) Power	(d) ampere

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4.

(i) Kirchhoff's Ist Law	(a) Junction rule
(ii) Joule's Law	(b) $H = I^2RT$
(iii) Kirchhoff's Iind Law	(c) Voltage rule
(iv) Nichrome	(d) Alloy

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Additional Questions Solved Assertion And Reason Type

1. Assertion: Fuse wire must have high resistance and low melting point.

Reason: Fuse is used for small current flow only

A. If both assertion and reason are true and the reason in the correct explanation of the assertion.

B. If both assertion and reason are true but the reason is not correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: C

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2. Assertion: In practical application, power rating of resistance is not important.

Reason: Property of resistance remains same even at high temperature

A. If both assertion and reason are true and the reason in the correct explanation of the assertion.

B. If both assertion and reason are true but the reason is not correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: D

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3. Assertion: Electric appliances with a metallic body have three wire connections.

Reason: Three pin connections reduce heating of the connecting wires.

A. If both assertion and reason are true and the reason in the correct explanation of the assertion.

B. If both assertion and reason are true but the reason is not correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: C

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Additional Questions Solved Short Answer Questions

1. Define current?

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2. Define instantaneous current.

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3. What is resistance? Give its unit?

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4. What is meant by transition temperature?

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5. What is Joule's heating effect ?

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6. What is meant by thermoelectric effect?

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7. What is a thermopile? On what principle does it work?

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8. What is a thermistor?

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9. State the principle of potentiometer.

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Additional Questions Solved Long Answer Questions

1. Explain the concept of colour code for carbon resistors.

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2. How does one cane understand the temperature dependence resistivity of a conductor ?

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3. Explain the effective internal resistance of cells connected in parallel combination. Compare the results to the external resistance.

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4. Explain the effective internal resistance of cells connected in parallel combination. Compare the results to the external resistance.

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Additional Questions Solved Numerical Problems

1. Show that one ampere is equivalent to a flow of 6.25×10^8 elementary charges per second.

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2. Calculate the resistivity of a material of a wire 10 m long. 0.4 mm in diameter and having a resistance of 2.0Ω.

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3. A wire of 10 ohm resistance is stretched to thrice its original length. What will be its (i) new resistivity and (ii) new resistance?

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4. A copper wire has a resistance of 10Ω and an area of cross-section $1mm^2$. A potential difference of 10 V exists across the wire. Calculate the drift speed of electrons if the number of electrons per cubic metre in copper is 8×10^{28} electrons.

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5. (i) At what temperature would the resistance of copper conductor be double its resistance at $0^{\circ} C$.

(ii) Does this temperature hold for all copper conductors regardless of shape and size? Given α for $Cu = 3.9 \times 10^{-3 \circ} C^{-1}$.

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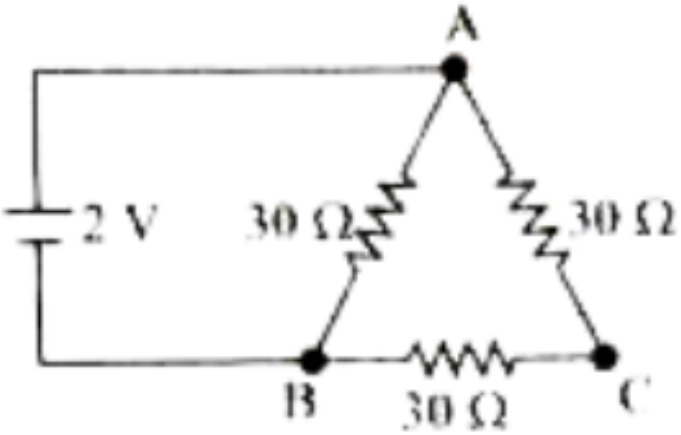
6. Find the value of current I in the circuit shown in figure.



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