PHYSICS

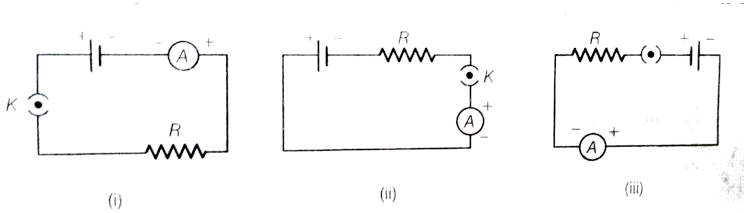
BOOKS - NCERT PHYSICS (ENGLISH)

ELECTRICITY

Multiple Choice Questions

1. A cell, a resistor, a key and an ammeter are arranged as known in the circuit diagrams of figure. The current recorded in the ammeter

will be



A. maximum in (i)

B. maximum in (ii)

C. maximum in (iii)

D. the same in all the cases

Answer: D

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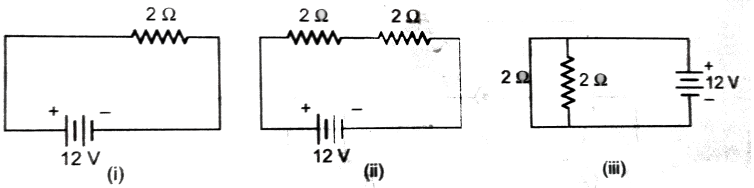
2. In the following circuits, heat produced in the resistor or combination of resistors connected to a 12 V battery will be



A. same in all the cases

B. maximum in (i)

C. maximum in (ii)

D. maximum in case (iii)

Answer: D

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3. Electrical resistivity of a given metallic wire depends upon :

A. its length

B. its thickness

C. its shape

D. nature of the material

Answer: D

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4. A current of $1A$ is drawn by a filament of an electric bulb. Number of electrons passing through a cross-section of the filament in 16 seconds would be roughly :

A. 10^{20}

B. 10^{16}

C. 10^{18}

D. 10^{23}

Answer: A

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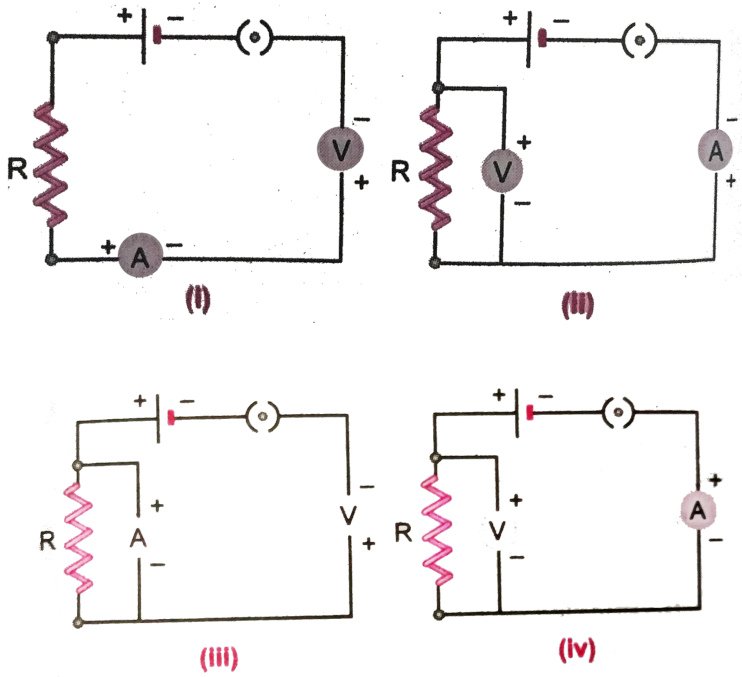
5. Identify the circuit, (Fig. 3.39) in which the electrical components have been properly connected.



A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: B

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6. What is the maximum resistance which can be made using five resistors each of $(1/5)\Omega$?

A. $1/5\Omega$

B. 10Ω

C. 5Ω

D. 1Ω

Answer: D

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7. What is the minimum resistance which can be made using five resistors each of $(1/5)\Omega$?

A. $1/5\Omega$

B. $1/25\Omega$

C. $1/10\Omega$

D. 25Ω

Answer: B

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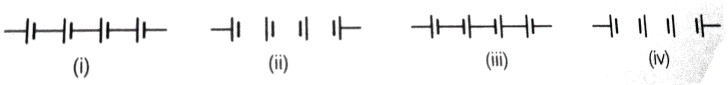
8. The proper representation of series combination of cells obtaining maximum potential is



A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: A

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9. Which of the following represents voltage ?

A. $\frac{\text{Work done}}{\text{Current} \times \text{Time}}$

B. $\text{Work done} \times \text{Charge}$

C. $\frac{\text{Work Done} \times \text{Time}}{\text{Current}}$

D. $\text{Work done} \times \text{Charge} \times \text{Time}$

Answer: A

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10. A cylindrical conductor of length l and uniform area of cross-section A has resistance R. Another conductor of length $2l$ and resistance R of the same material has area of cross-section :

A. $A/2$

B. $3A/2$

C. $2A$

D. $3A$

Answer: C

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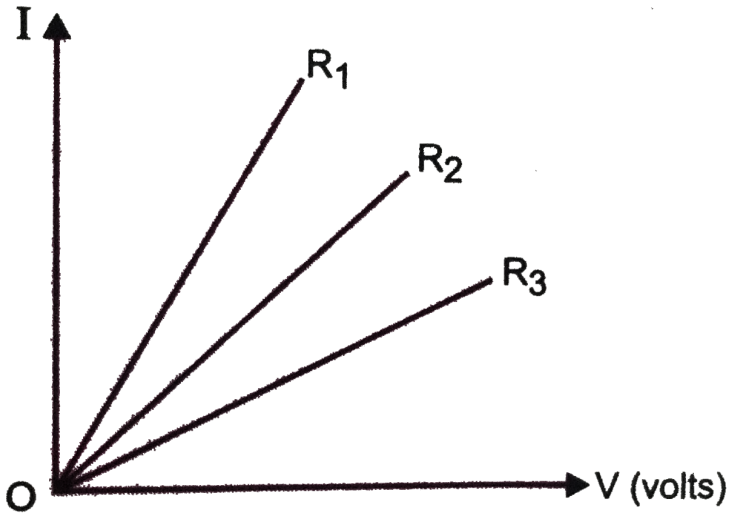
11. A student carries out an experiment and plots the $V - I$ graphs of three samples of nichrome wire with resistances R_1, R_2 and R_3 respectively, (Fig. 3.41). Which

of the following is true ?



A. $R_1 = R_2 = R_3$

B. $R_1 > R_2 > R_3$

C. $R_3 > R_2 > R_1$

D. $R_2 > R_3 > R_1$

Answer: C

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12. If the current I through a resistor is increased by $100\ \%$ (assume that temperature remains unchanged), the increase in power dissipated will be :

A. $100\ \%$

B. $200\ \%$

C. $300\ \%$

D. $400\ \%$

Answer: C

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13. The resistivity does not change if :

A. the material is changed

B. the temperature is changed

C. the shape of the resistor is changed

D. both material and temperature are changed

Answer: C

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14. In an electrical circuit three incandescent bulbs A, B and C of rating $40W, 60W$ and $100W$ respectively are connected in parallel to an electric source.

Which of the following is likely to happen regarding their brightness ?

A. Brightness of all the bulbs will be the same

B. Brightness of bulb A will be the maximum

C. Brightness of bulb B will be more than that of A

D. Brightness of bulb C will be less than that of B

Answer: C

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15. In an electrical circuit, two resistors of 2Ω and 4Ω respectively are connected in series to a $6V$ battery. The heat dissipated by the 4Ω resistor in $5s$ will be :

A. 5 J

B. 10 J

C. 20 J

D. 30 J

Answer: C

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16. An electric kettle consumes $1kW$ of electric power when operated at $220V$. A fuse-wire of what rating must be used for it ?

A. $1A$

B. $2A$

C. $4A$

D. $5A$

Answer: D

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17. Two resistors of resistances 2Ω and 4Ω when connected to a battery will have :

A. same current flowing through them when connected in parallel

B. same current flowing through then when connected is series

C. same potential difference across them when connected is series

D. different potential difference across them when connected in parallel

Answer: B

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18. Unit of electric power may also be expressed as :

A. volt ampere

B. kilowatt hour

C. watt second

D. joule second

Answer: A

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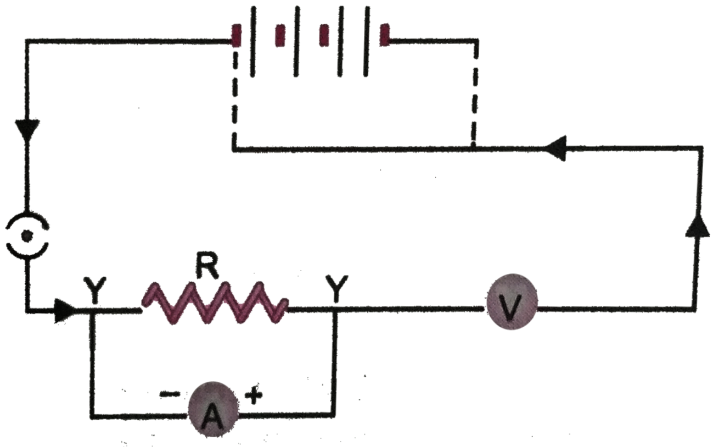
Short Answer Type Questions

1. A child has drawn the electric circuit to study Ohm's law as shown in (Fig. 3.42). His teacher told him that the circuit diagram needs correction. Study the circuit diagram and redraw it after making all corrections.



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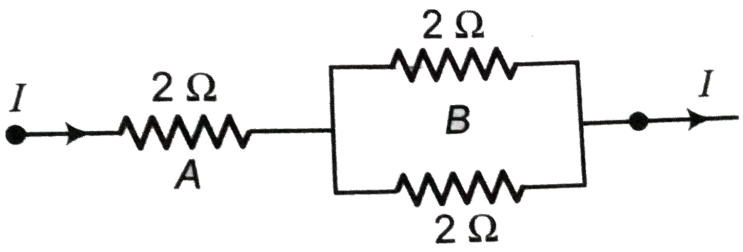
2. Three 2Ω resistors, A, B and C are connected as shown in figure. Each of them dissipates energy and can with stand a maximum power of 18 W without melting. Find the maximum current that can flow through the three resistors ?



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3. Should the resistance of an ammeter be low or high ? Give reason.

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4. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistance of 2Ω in series with a combination of two resistors (4Ω each) in parallel and a voltmeter across the parallel combination. Will the potential difference across the 2Ω resistor

be the same as that across the parallel combination of 4Ω resistors ? Give reason.

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5. How does use of a fuse-wire protect electrical appliances ?

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6. What is electrical resistivity ? In a series electrical circuit comprising a resistor made

up of a matallic wire, the ammeter reads $5A$. The reading of the ammeter decreases to half when the length of the wire is doubled. Why ?

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7. What is the commercial unit of electrical energy ? Represent it in terms of joules.

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8. (a) A current of $1A$ flows in a series curcuit containing an electric lamp and a conductor of 5Ω when connected to a $10V$ battery. Calculate the resistance of the electric lamp.

(b) Now if a resistance of 10Ω is connected in parallel with this series combination, what change (if any) in current flowing through 5Ω conductor and potential difference across the lamp will take place ? Give reason.

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9. Why is parallel arrangement used in domestic wiring ?

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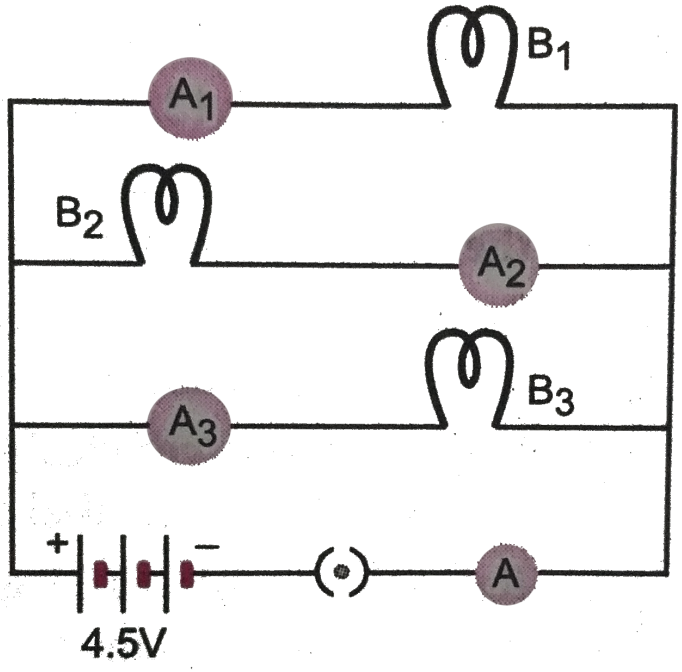
10. B_1, B_2 and B_3 are three identical bulbs connected as shown in (fig. 3.46). When all the three bulbs glow, a current of $3A$ is recorded by the ammeter A.

(i) What happens to the glow of the other two bulbs when the bulb B_1 gets fused ?

(ii) What happens to the readings of

A_1, A_2, A_3 and A when the bulb B_2 gets fused ?

(iii) How much power is dissipated in the circuit when all the three bulbs glow together ?



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11. Three incandecent bulbs of $100W$ each are connected in series in an electric circuit. In another circuit another set of three bulbs of the same wattage are connected in parallel to the same source.

(a) Will the bulbs in the two circuits glow with the same brightness ? Justify your answer.

(b) Now let one bulb in both the circuits get fused. Will the rest of the bulbs continue to glow in each circuit ? Give reason.

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12. State Ohm's law ? How can it be verified experimentally ? Does it hold good under all conditions ? Comment.

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13. What is electrical resistivity ? How does it depend om temperature. Give its SI unit.

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14. How will you infer with the help of an experiment that the same current flows through every part of the circuit containing three resistances in series connected to a battery ?

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15. How will you conclude that the same potential difference (voltage) exists across

three resistors connected in a parallel arrangement to a battery ?

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16. What is Joule's heating effect ? How can it be demonstrated experimentally ? List its four applications in daily life.

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17. Find out the folowing in the electric circuit given in (Fig. 3.48).

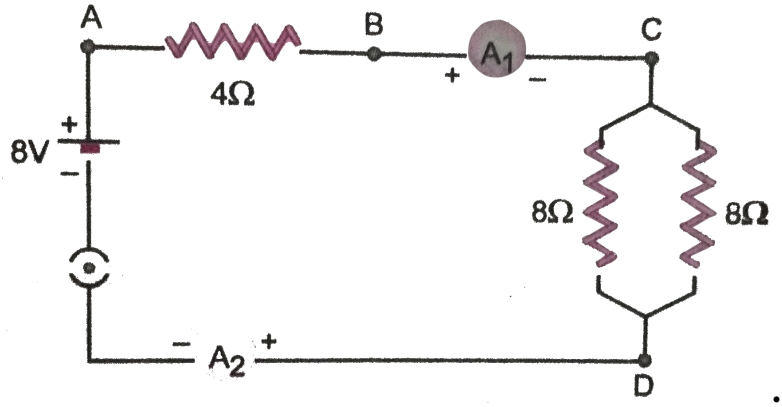
(a) Effective resistance of two 8Ω resistors in the combination

(b) Current flowing through 4Ω resistor

(c) Potential difference across 4Ω resistance

(d) Power dissipated in 4Ω resistor

(e) Difference in ammeter readings, if any.



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