نيوتن العرب



مراجعة الإنقاذ في الفيزياء

مع خالص الدعاء بالتوفيق والنجاح

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Final Revision EoT2-Coverage-G12-Adv

Multiple Choice Questions Part

1 The total charge passing through a point in time is given by the formula.

ⓐ $q = \int_{t_i}^{t_f} i\,dt$

ⓑ $q = \int_{t_i}^{t_f} 2i\,dt^2$

ⓒ $q = -\int_{t_i}^{t_f} i\,dt$

ⓓ $q = \int_{t_i}^{t_f} \frac{1}{i}\,dt$

2 A metal wire in which an electric current flow and the amount of charge changes with time according to the equation ($q = 4t^2 - 3t + 1$) where q it is measured in unit coulomb .Calculate the magnitude of electric current flowing in the circuit at time (t=2.0s)

ⓐ $13A$

ⓑ $2A$

ⓒ $26A$

ⓓ $16A$

3 If the equation between charge and time is ($q=5t^2+3t$). What is the correct expression of the current (i)?

ⓐ $i = 10t + 3$

ⓑ $i = 5t^2 + 3t$

ⓒ $i = \frac{5t^3}{3} + \frac{3t}{2}$

ⓑ $i = 10t + 3t$

4 A metal wire carrying an electric current that changes in strength with time according to the equation $i = 6t^3 - 5t^2$ where I measured by unit ampere Calculate the amount of electric charge that passes through a section of wire during the time (t=0.5s,t=2.0s)

ⓐ 1.5C

ⓑ 45.3C

ⓒ 10.8C

ⓑ 37.8C

5 The number of charges that must flow through a device through (5s) for it to function normally is (6.4×10^{19}) What is the current flows through the device ?

ⓐ $3A$

ⓑ $2A$

ⓒ $1A$

ⓓ $3A$

6 A bolt of lightning has an electric current of (3.5×10^4A) when hits the ground. If the lightning lasts for (14μs) , the amount of charges that is transferred to the ground is:

ⓐ 0.50 C ⓒ $4.90X10^2$ C

ⓑ $4.9X10^5$ C ⓓ 49.0 C

7 What is the current passing through a conductor with radius of (3.1mm) , if the current density through this conductor is(5.2 A/m^2) ?

ⓐ 1.6×10^{-4} A ⓒ 5.1×10^{-2} A

ⓑ 3.5×10^{-3} A ⓓ 2.2×10^{-4} A

8 Which of the following equations correctly represent the electric current in terms of the current density?

ⓐ $i=\int \frac{1}{J}\cdot dA$ ⓒ $i=\int J^2\cdot dA$

ⓑ $i=\int \frac{1}{J^2}\cdot dA$ ⓓ $i=\int J\cdot dA$

the wire ,it's a across section area A_1. If the wire replaced with another its radius tribble the first wire . what will happen in current density through the second wire?

9

ⓐ increase by factor 3 ⓒ increase by factor 9

ⓑ decrease by factor 1/9 ⓓ decrease by factor 1/3

10 A current of 0.123 mA flows in a silver wire whose cross-sectional area is 0.923 mm^2. Find the current density in the wire assuming that the current is uniform.

ⓐ $133.26A/m^2$ ⓒ $144.37A/m^2$

ⓑ $0.133A/m^2$ ⓓ $0.144A/m^2$

What is the current density in an aluminum wire having a radius of 1.00 mm and carrying a current of 1.00 mA?

11

ⓐ $101.32A/m^2$ ⓒ $318.3A/m^2$

ⓑ $3.14A/m^2$ ⓓ $0.31A/m^2$

12 Which of the following is not true for current density(j) and current (i)?

ⓐ Unit of current density equal to Ampere per Meter

ⓑ Unit of current density equal to Ampere per Meter square

ⓒ $j = \frac{i}{A}$

ⓓ $i = \int j.dA$

13 Two wires carry the same current, but if the area of the second wire is 3 times the area of the first wire, which of the following is true?

ⓐ $J_2 = \frac{1}{9}J_1$

ⓑ $J_2 = \frac{1}{3}J_1$

ⓒ $J_2 = 9J_1$

ⓓ $J_2 = 3J_1$

14 A potential difference of (18.0V) is used on a wire whose cross-sectional area($5.0mm^2$) and length is equal(370km) . The electric current flowing through the wire is (1.5×10^{-2}A). What is the material of the wire?

ⓐ Iron 9.74×10^{-8} Ωm

ⓑ Nichrome 108×10^{-8} Ωm

ⓒ Copper 1.72×10^{-8} Ωm

ⓓ Silver 1.62×10^{-8} Ωm

15 How will the resistance of a copper wire change if its length is tripled (without changing in its cross-sectional area)?

ⓐ increase by factor 3

ⓑ decrease by factor 1/9

ⓒ increase by factor 9

ⓓ decrease by factor 1/3

16 How will the resistance and current that flowing through a copper wire change if the radius of the wire is doubled?

ⓐ increase by factor 4

ⓑ decrease by factor 1/4

ⓒ increase by factor 2

ⓓ decrease by factor ½

17 What is the resistance (R) of a silver wire ($\rho=1.62\times10^{-8}$ Ω.m), has a length of(3.0 m) and a radius of(52mm)?

ⓐ 5.7×10^{-6} Ω

ⓑ 3.4×10^{-6} Ω

ⓒ 2.6×10^{-6} Ω

ⓓ 1.9×10^{-6} Ω

18 The (2.0 m) length hollow silver tube shown in the figure has inner radius of (2.0 cm) and outer radius of (3.0 cm) what is the resistance of this conductor? (ρ=1.62×10^{-8} Ω.m)

ⓐ 1.0×10^{-5} Ω ⓒ 3.6×10^{-5} Ω

ⓑ 2.1×10^{-5} Ω ⓓ 4.4×10^{-5} Ω



19 Which of the following is equal to the unit of siemens (S)?

ⓐ $1S = \frac{1A}{1V}$ ⓒ $1S = \frac{1A^2}{1V}$

ⓑ $1S = \frac{1V}{1A}$ ⓓ $1S = \frac{1V^2}{1A}$

20 A cylindrical aluminum wire is (32m) long and has a resistance 0.20 Ω the resistivity of aluminum is (2.82 x10-8 Ω.m). What is the radius?

ⓐ $4.512 \times 10^{-6}m$ ⓒ $1.436 \times 10^{-6}m$

ⓑ $1.198 \times 10^{-3}m$ ⓓ $1.436 \times 10^{-3}m$

21 If the Conductance of the wire is 0.9S, and there is another wire of the same material and the same length, and the radius of the second wire is 3 times that of the first wire, what is the Conductance of the second wire?

ⓐ 0.9S ⓒ 2.7S

ⓑ 8.1S ⓓ 0.3S

22 What happens when the potential difference in a cylindrical conductor increases?

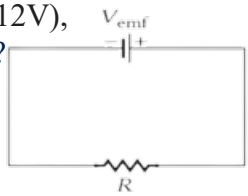
ⓐ The current through the conducting cylinder decreases . ⓒ The current through the conducting cylinder increases .

ⓑ The resistance of the conducting cylinder increases . ⓓ The resistance of the conducting cylinder decreases.

23 For the electric circuit shown in the figure: if the battery's electromotive force is (12V), the resistance is (R=2.4Ω),what is the electric current flowing through the circuit?

ⓐ 5.0A ⓒ 28.8A

ⓑ 0.2A ⓓ 2.0A

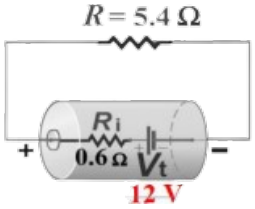


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23 For the electric circuit shown in the figure: if the battery's electromotive force is (12V), the resistance is(R=2.4Ω), what is the electric current flowing through the circuit?

ⓐ **5.0** A ⓒ 0.2 A

ⓑ **28.8** A ⓓ 2.0 A



24 A 6.0 V battery with an internal resistance of 0.30 Ω is connected to a 1.20 Ω resistor. What is the electric current flowing through the circuit?

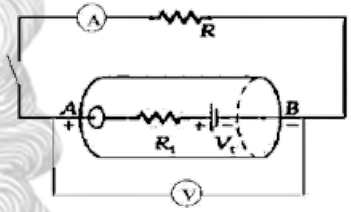
ⓐ 5A ⓒ 9A

ⓑ 4A ⓓ 20A

25 Consider a battery that has (Vt = 12.0 V) when it is not connected to a circuit, When a (10.0 Ω) resistor is connected with the battery, the potential difference across the battery's terminals drops to(10.9 V). What is the internal resistance of the battery?

ⓐ 1.0 Ω ⓒ 120.0 Ω

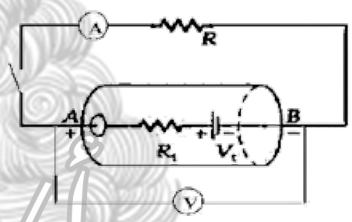
ⓑ 2.3 Ω ⓓ 109.0 Ω



In the previous figure if the reading voltmeter when the circuit is open (12v) and when the circle was closed a voltmeter reading became (11.5v) and reading of ammeter (2A)
What is the internal resistance of the battery?

26 ⓐ 6.0 Ω ⓒ 5.75 Ω

ⓑ 0.25 Ω ⓓ 11.75 Ω



The quantity 1mAh is equal to

27 ⓐ 3.6As ⓒ 3.6A

ⓑ 3.6C ⓓ A+B is correct

A rechargeable battery is rated at(3.0mAh).What is the total charge in Coulombs unit(C) of the battery can deliver when fully charged? (mAh means milliampere-hour)

28 ⓐ 10.8C ⓒ 3.0C

ⓑ 3.6C ⓓ 1.6C

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29 Which of the following is equivalent to 3.6 C?

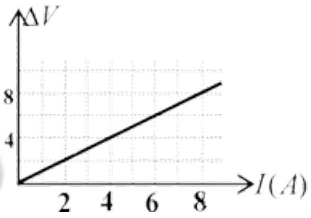
ⓐ **1**.0 milliampere. Hour ⓒ **1.0** ampere. Hour

ⓑ **1.0** ampere. Second ⓓ **1.0** milliampere. Second

30 The adjacent graph shows the voltage changes be-tween the two terminals of a resistor and the current passing through it. What is the resistance?

ⓐ 1.0 Ω ⓒ 0.5 Ω

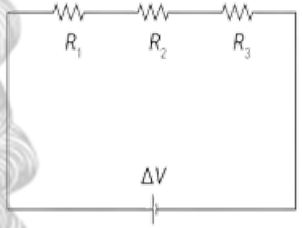
ⓑ 2.3 Ω ⓓ 4.0 Ω



31 For the circuit shown in the figure,$R_1 = 2.0\ \Omega$,$R_2 = 1.0\ 0\Omega$, $R_3 = 5.0\ \Omega$, and the potential difference is 40.V. What is the current flowing through the circuit?

ⓐ 8 A ⓒ 5 A

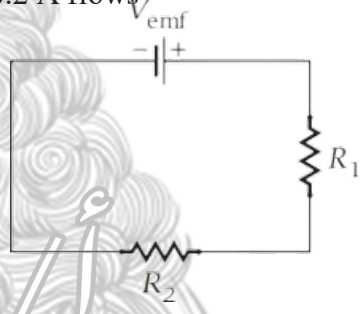
ⓑ 20 A ⓓ 40 A



32 For the circuit shown in the figure, $\boldsymbol{R_1 = 3R_2}$ and $\boldsymbol{V_{emf}}$ is 8.0 V. if a current of 0.2 A flows through the circuit What is the resistance of $\boldsymbol{R_1}$?

ⓐ 40.0 Ω ⓒ 20.0 Ω

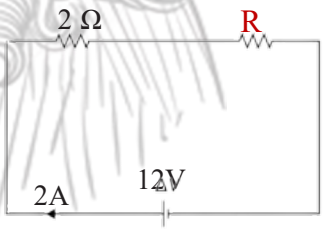
ⓑ 10.0 Ω ⓓ 30.0 Ω



33 For the electric circuit shown in the figure, find the value of (R)

ⓐ 4.0 Ω ⓒ 6.0 Ω

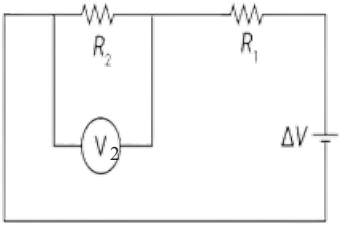
ⓑ 8.0 Ω ⓓ 5.0 Ω



34 Based on the figure below which statement is true ?

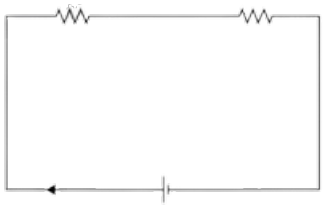
ⓐ $V_2 < V$ ⓒ $V_2 = V$

ⓑ $V_2 > V$ ⓓ $V_2 = 0$



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35 According to the figure, when a third resistor is added in series to the two resistors connected in series . What happens to the electric current passing through the circuit?



ⓐ Decrease ⓒ Stays the same

ⓑ Increase ⓓ Becomes infinity

36 Four resistors,1.0 Ω , 3.0 Ω , 5.0 Ω, and 4.0 Ω , are connected in series with a 9.0 V battery. What is the equivalent resistance of the circuit?

ⓐ 13.0 Ω ⓒ 1.8 Ω

ⓑ 6.0 Ω ⓓ 0.6 Ω

37 Abdelrahman connected eight 12 Ω lamps in series .What is the total resistance of the circuit ?

ⓐ 0.67 Ω ⓒ 1.5 Ω

ⓑ 12 Ω ⓓ 96 Ω

38 Which of the following is an incorrect statemen?

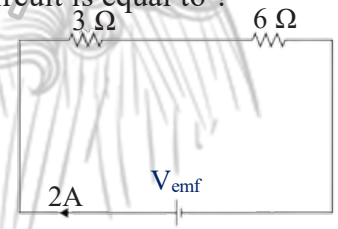
ⓐ More current flows across the smaller resistance when two resistors are connected in series.

ⓒ More current flows across the smaller resistance when two resistors are connected in parallel.

ⓑ The potential drops across devices connected in parallel are equal.

ⓓ The currents through devices connected in series are equal.

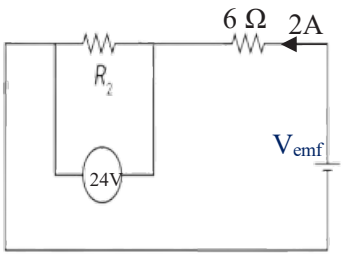
39 The electric potential difference between the battery terminals shown in the circuit is equal to ?



ⓐ 12V ⓒ 6V

ⓑ 18V ⓓ 27V

In the figure if the Voltmeter Reading is24 V. then Amount of R_2:



40

ⓐ 12.0 Ω ⓒ 4.0 Ω

ⓑ 6.0 Ω ⓓ 3.0 Ω

41 An electrical circuit consisting of three resistors connected in parallel , with a battery and a switch. The most important characteristic of this type of connection is that:

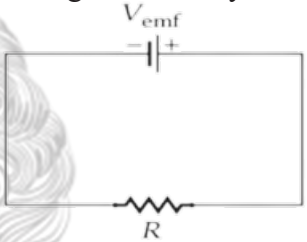
ⓐ The total potential difference equals the sum of the potential difference between each

ⓑ All of these resistors must have the same electrical current

ⓒ When current stops flowing through one of these resistors, it stops flowing to the restrictors

ⓓ The total current must be equal to the sum of the sub currents passing through these resistors

42 For the circuit shown in the figure, if another resistor with equal resistance was connected with R in parallel, what happens to the magnitude of the current flowing through the battery?



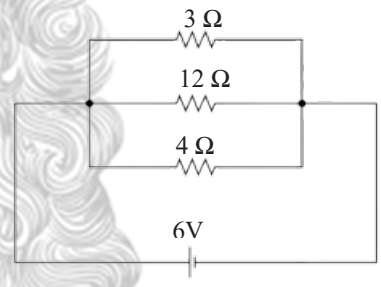
ⓐ Becomes twice

ⓑ Stays the same

ⓒ Becomes half

ⓓ Becomes four times

43 What is the equivalent resistance of the circuit shown below ?



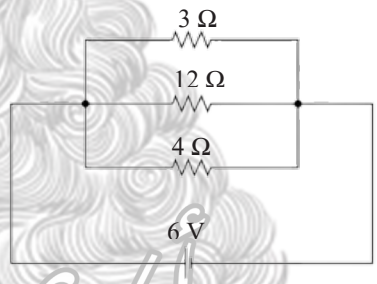
ⓐ 1.0 Ω

ⓑ 1.5 Ω

ⓒ $\frac{1}{19}$ Ω

ⓓ 19.0 Ω

44 What is the Current of the circuit shown below ?



ⓐ 4A

ⓑ 0.25 A

ⓒ 0.32A

ⓓ 3.2A

45 Three identical resistors connected together in parallel. If the equivalent of the three resistors is(6.0 Ω). What is the resistance of any resistor of them?

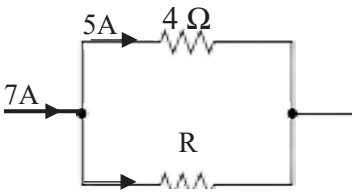
ⓐ 4 Ω

ⓑ 2 Ω

ⓒ 6Ω

ⓓ 18 Ω

46 The amount of resistance R in the figure is equal :



ⓐ 20Ω

ⓑ 2 Ω

ⓒ 12Ω

ⓓ 10 Ω

47 A parallel circuit has four branch currents:120 mA ,250 mA ,380 mA ,and1.25A. How much current passes through the power source?

ⓐ 0.75A ⓒ 2A

ⓑ 0.75mA ⓓ 2mA

48 Three equal resistors connected in parallel to a battery(12.0V) If a current of(1.5A). What is the resistance of each of them?

ⓐ 24Ω ⓒ 2.66 Ω

ⓑ 8 Ω ⓓ 1.5 Ω

49 An electrical device with a power of (968W) is connected to a source of electromotive force (V =220V). What is the resistance of this device?

ⓐ 50 Ω ⓒ 4.4 Ω

ⓑ 2 Ω ⓓ 0.23 Ω

50 A DC winch motor is rated at 20 A with a voltage of 115 V. What is the power consumed by the motor?

ⓐ 3300W ⓒ 2300W

ⓑ 200W ⓓ 1300W

51 A current of 6.0 A passes through a 325 W heater. What is the resistance of the heater?

ⓐ 88 Ω ⓒ 54Ω

ⓑ 4.5 Ω ⓓ 9 Ω

52 An 80.0 W power filament bulb whose resistance is 45 Ω. what is the current passing through the filament bulb?

ⓐ 1.3A ⓒ 12A

ⓑ 0.56A ⓓ 1.8A

53 What is the potential difference between the two ends of the lamp whose resistance is 484Ω when operating at the power of 1.00×10^2 W?

ⓐ 220 V ⓒ 136 V

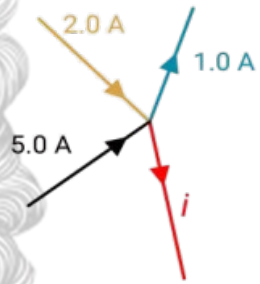
ⓑ 116 V ⓓ 48400 V

54 A 100W light bulb connected to a120 V power line. The current in the light bulb is equal ?

ⓐ 0.83A ⓒ 1.2A

ⓑ 0.38A ⓓ 2.1A

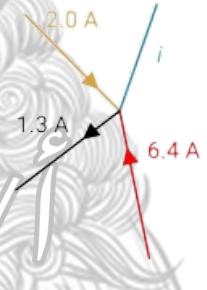
55 Four wires are connected to each other as shown to the right. The electric current passing through the red wire is



ⓐ 6 . 0 A ⓒ 3 . 0 A

ⓑ 8 . 0 A ⓓ 2 . 0 A

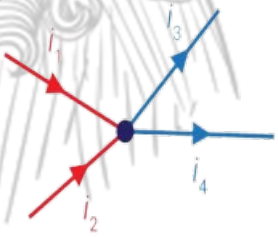
56 Four wires that carry different amounts of currents are connected to a single point as shown. The electric current through the blue wire is and the junction.



ⓐ 5.7A leaves ⓒ 7.1A leaves

ⓑ 9.7A enters ⓓ 7.1A enters

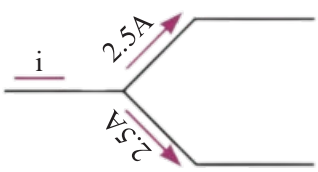
57 Which of the below choices are correct about the image shown?



ⓐ $i_1+i_2=i_3+i_4$ ⓒ $i_1+i_4=i_2-i_3$

ⓑ $i_1+i_3=i_2+i_4$ ⓓ $i_1+i_4=i_2+i_3$

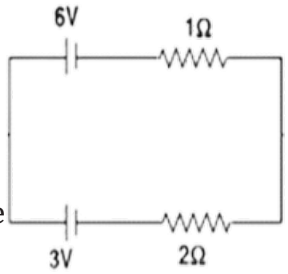
58 According to the figure, what is the magnitude and direction of (***i***)



ⓐ 6.0A left ⓒ 1.0A right

ⓑ 1.0A left ⓓ 6.0A right

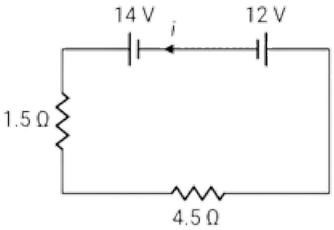
59 What is the current flowing through the loop shown in the figure?



ⓐ 1A Clockwise ⓒ 1A Counterclockwise

ⓑ 2A Clockwise ⓓ 2A Counterclockwise

60 Two resistors are connected to two batteries as shown . What is the electric current flowing through the wires?



ⓐ 6.0A ⓒ 0.33A

ⓑ -4.3A ⓓ 4.3A

61 When analyzing loops in electric circuits, which of the following assumptions is correct for the conventions used to determine the sign of potential changes?

ⓐ

Element	Direction of Analysis	Potential Change
R	Same as current	-iR
R	Opposite to current	+iR
V_{emv}	Same as emf	$+V_{emv}$
V_{emv}	Opposite to emf	$-V_{emv}$

ⓒ

Element	Direction of Analysis	Potential Change
R	Same as current	-iR
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V_{emv}	Same as emf	$-V_{emv}$
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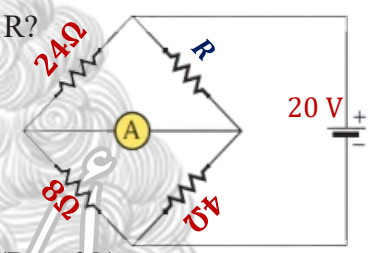
ⓑ

Element	Direction of Analysis	Potential Change
R	Same as current	+iR
R	Opposite to current	-iR
V_{emv}	Same as emf	$+V_{emv}$
V_{emv}	Opposite to emf	$-V_{emv}$

ⓓ

Element	Direction of Analysis	Potential Change
R	Same as current	+iR
R	Opposite to current	-iR
V_{emv}	Same as emf	$-V_{emv}$
V_{emv}	Opposite to emf	$+V_{emv}$

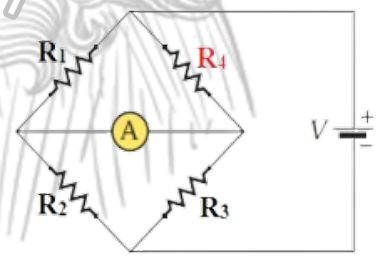
62 If the reading of the sensitive ammeter (A) is zero, what is the magnitude of R?



ⓐ 8 Ω ⓒ 24 Ω

ⓑ 12 Ω ⓓ 4 Ω

63 According to the figure, if the reading of the sensitive ammeter (A) is zero, (R_1 =6Ω), (R_2 =4Ω) and (R_3 =8Ω), what is the magnitude of (R_4)

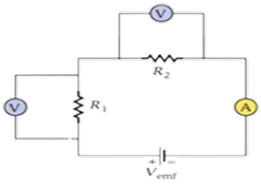


ⓐ 6 Ω ⓒ 18 Ω

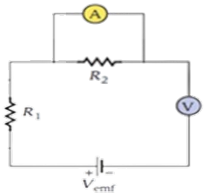
ⓑ 12 Ω ⓓ 4 Ω

Which of the circuits shown in the figure will function properly ?

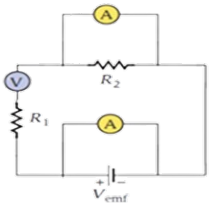
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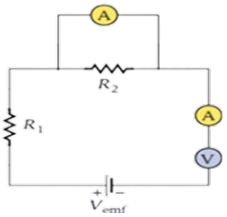
ⓐ



ⓑ

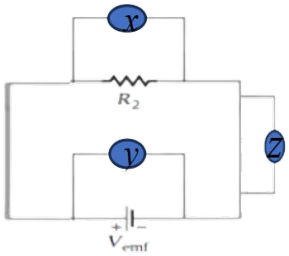


ⓒ



ⓓ

65 Three voltmeters are shown in the figure. Which one will measure zero?



ⓐ X ⓒ Z

ⓑ Y ⓓ Z,X

66 A resistor of resistance1.5Ω is connected in series across a battery of electromotive force9.0 V and a parallel-plate capacitor of capacitance25 μF. What is the amount of charge on the plates of the capacitor after a time interval equal to the time constant?

ⓐ 5.27×10^{-4} C ⓒ 1.42×10^{-6} C

ⓑ 5.27×10^{-6} C ⓓ 1.42×10^{-4} C

67 the RC circuit which $R = 1.50\ M\Omega$, $C = 4.00\mu F$, and Vemf= 25.0 V. Find the time constant of the circuit.

ⓐ 6s ⓒ 4 s

ⓑ 0.75s ⓓ 0.23s

68 A series RC circuit for which $R = 1.0\ M\Omega$, $C = 5.0\ \mu F$, and Vemf= 30 V
Find the charge on the capacitor 10 s after the switch is closed.

ⓐ $1.30 \times 10^{-4}\ C$ ⓒ $1.30 \times 10^{-6}\ C$

ⓑ $5\ C$ ⓓ $1.42\times 10^{-4}\ C$

69 If the time constant is 0.1s and the resistance is 1000 Ω, calculate the capacitance of the capacitor.

ⓐ $1.0 \times 10^{-4} F$ ⓒ $1.0 \times 10^{3} F$

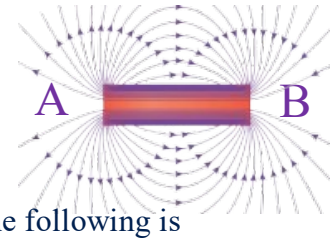
ⓑ $1.0 \times 10^{-1} F$ ⓓ $6.0 \times 10^{-4} F$

70 An RC circuit consisting of a (12.0V) battery. The charge (q) the capacitor as a function of time is given by : $q(t) = 6.0 \times 10^{-4}\left(1 - e^{\frac{-t}{0.1}}\right)$

ⓐ $6.0 \times 10^{-4} F$ ⓒ $6.0 \times 10^{-5} F$

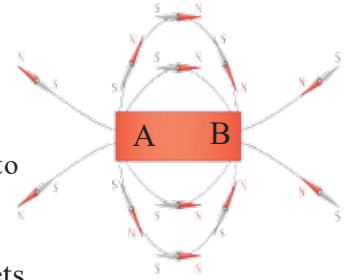
ⓑ $5.0 \times 10^{-5} F$ ⓓ $7.2 \times 10^{-5} F$

71 The figure shows the magnetic field lines of a permanent magnet. Which of the following is correct when determining the north pole and south pole of the magnet?



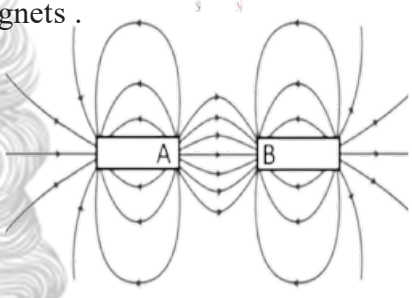
ⓐ B is the north pole
ⓒ B is the south pole
ⓑ A is the north pole
ⓓ There isn't enough data to determine the poles

72 The figure shows the magnetic field lines of a permanent magnet. Which of the following is correct when determining the north pole and south pole of the magnet?



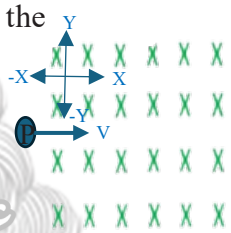
ⓐ B is the north pole
ⓒ B is the south pole
ⓑ A is the north pole
ⓓ There isn't enough data to determine the poles

73 The diagram below represents the magnetic field lines around two bar Magnets . Identify the poles at positions A and B.



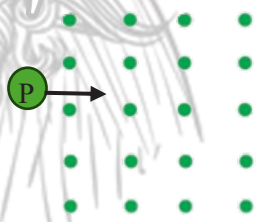
ⓐ A=north pole B=south pole
ⓒ A=south pole B=south pole
ⓑ A=south pole B=north pole
ⓓ A=north pole B=north pole

74 According to the figure, in what direction the proton (p) will be deflected as it enters the constant magnetic field (B) ?



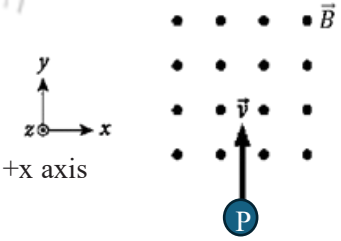
ⓐ Toward y positive
ⓒ Into the page
ⓑ Toward y negative
ⓓ Out of the page

75 According to the figure, in what direction the proton (p) will be deflected as it enters the constant magnetic field (B) ?



ⓐ Toward y positive
ⓒ Into the page
ⓑ Toward y negative
ⓓ Out of the page

76 A charged particle enters a uniform magnetic field as shown in the figure, what is the direction of the magnetic force that will exert on the particle?



ⓐ To the direction of +y axis
ⓒ To the direction of +x axis
ⓑ To the direction of -y axis
ⓓ To the direction of -x axis

78 Which of the following is an equivalent unit of Tesla?

ⓐ $\frac{N.s}{C.m}$ ⓒ $\frac{N}{A.m}$

ⓑ $\frac{N.C}{s.m}$ ⓓ A+ C are correct

79 A charged particle with charge of(3.2×10^{-12} C) , enters a uniform magnetic field, the charged particle follows a helical path with radius of (2.5 m) , if the perpendicular component of the charged particle momentum is (1.6×10^{-12} kg.m/s) ,what is the magnitude of the magnetic field?

ⓐ 0.20T ⓒ 0.40 T

ⓑ 0.30 T ⓓ 0.07 T

80 A particle with charge (q=+3.2μC) and speed (v=520m/s), enters a uniform magnetic field of (B=0.2T) as seen in the figure. What is themagnitude of the magnetic force on the particle?

ⓐ 332.8μN ⓒ 3.2μN

ⓑ 166.4μN ⓓ 520μN

81 Proton moving with a speed of 4.00×10^{5}m/s in the positivey-direction enters auniform magnetic field of 0.400T pointingi n the positive direction .Calculate the magnitude of the force on the proton.

ⓐ 2.56×10^{-14} N ⓒ 3.23×10^{-12} N

ⓑ 2.56×10^{-19} N ⓓ 3.23×10^{-14} N

82 The magnitude of the magnetic force on a particle with charge -2e moving with speed v = 1.0×10^{5} m/s is 3.0×10^{-18} N. What is the magnitude of the magnetic field ($e=1.6\times10^{-19}$ c)

ⓐ $9.4x10^{-5}$ T ⓒ $1.5X10^{-23}$ T

ⓑ $1.9X10^{-4}$ T ⓓ $3.0X10^{-23}$ T

83 In the equation ($B = \frac{mv}{|q|x}$), what does (x) represent ?

ⓐ The radius ⓒ The angle

ⓑ The diameter ⓓ The acceleration

84 According to the figure, an isolated segment of wire of length (L=8.3m) carries a current of magnitude (i=1.5A) at an angle (θ=60.0°) with respect to a constant magnetic field of agnitude (B=5.4×10^{-2} T). What is the magnitude of the magnetic force on the wire?

ⓐ 0.58N ⓒ 0.33N

ⓑ 0.29N ⓓ 2.16N

85 A straight wire of length (2.0m) and a current of (24.0A) is flowing in it on a horizontal table surface in aregular horizontal magnetic field, and the wire makes an angle ($\theta = 30°$) with the magnetic field lines. If the magnitude of the magnetic force acting on the wire is (0.50N) What is the magnitude of the magnetic field?

ⓐ 19.2T ⓒ 210 T

ⓑ 12 T ⓓ 0.21 T

86 A coil (X) consists of (400) loop and a coil (Y) consists (900) loop, If the torque on each loop of the coil (X) is equal to the torque on each loop of the coil (Y). What is the ratio of the torques (τ_X/τ_Y)

ⓐ 2/3 ⓒ 4/9

ⓑ 3/2 ⓓ 9/4

Recall that the SI unit of magnetic field strength is Tesla (T)

87

$$[F_B] = [q][v][B] \Rightarrow [B] = \frac{[F_B]}{[q][v]} = \frac{\text{N s}}{\text{C m}} \quad 1\ \text{T} = 1\ \frac{\text{N s}}{\text{C m}} = 1\ \frac{\text{N}}{\text{A m}}$$

88 Apply the relationship between the magnetic force , charge q, velocity , and the magnetic field B. Apply Newton's second law, for a charged particle in uniform circular motion due to a magnetic force, to derive an expression for the orbital radius.

$$qvB = ma \quad r = \frac{mv}{qB} \quad B = \frac{mv}{qr} \quad B = \frac{F}{qv}$$

An electron enters a uniform magnetic field at a velocity of $\mathbf{2.0 \times 10^6\ m/s}$ at right angle as shown in the figure. The field exerts a force of $\mathbf{5 \times 10^{-15}\ N}$ on the electron.

a-What is the magnetic field strength?

The charge of the electron is (q_e) = -1.6 × 10^{-19} C

2- What is the direction of the force acting on the electron?

89



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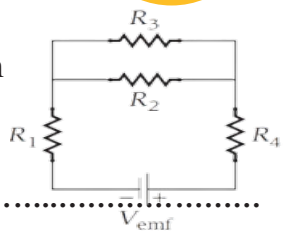
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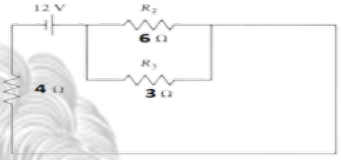
90 The circuit shown in Figure has four resistors and a battery with Vemf = 149 V. The values of the four resistors are $R_1 = 17.0\ \Omega$, $R_2 = 51.0\ \Omega$, $R_3 = 114.0\ \Omega$, and $R_4 = 55.0\ \Omega$.
What is the magnitude of the potential drop across R2?



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According to the circuit bellow:

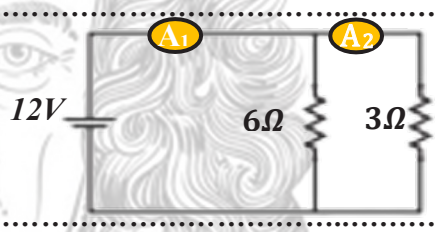
91 2) Find the current in R3.
3) Find the potential difference across R2.



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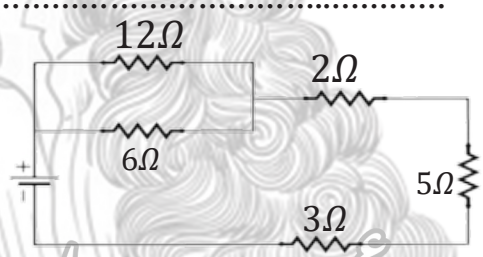
According to the circuit bellow:

92 *1) Find reading the ammeter A1.*
2) Find reading the ammeter A2



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The figure represents a circuit.

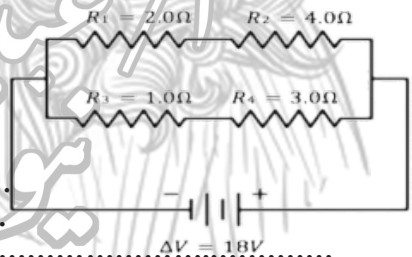


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The figure represents a circuit.

3) Calculate the equivalent resistance in the circuit.

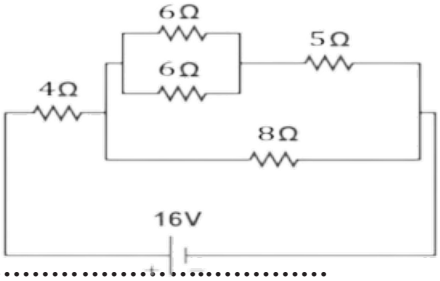
94 4) Calculate the total current in the circuit.



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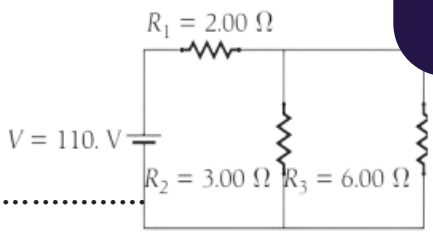
The figure represents a circuit.

1) Calculate the equivalent resistance in the circuit.
2) Calculate the total current in the circuit.



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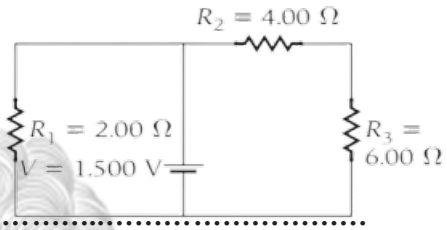
96



1) *Find the potential drop across R3.*
2) Find the current in R1.

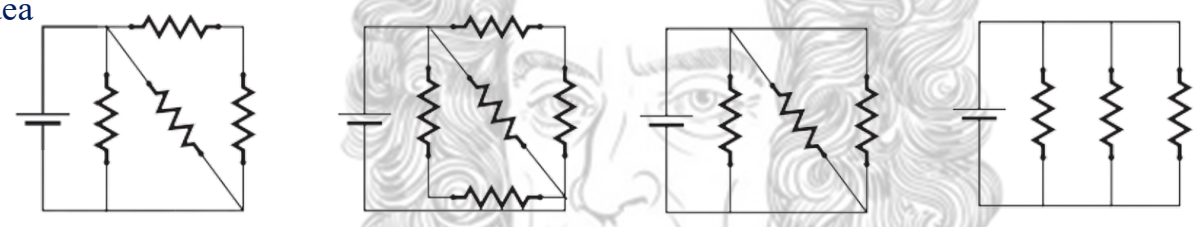
97

A battery with V = 1.500 V is connected to three resistors as shown in the figure.
Find the potential drop across each resistor.
Find the current in each resistor.



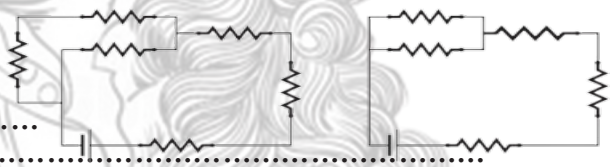
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Idea



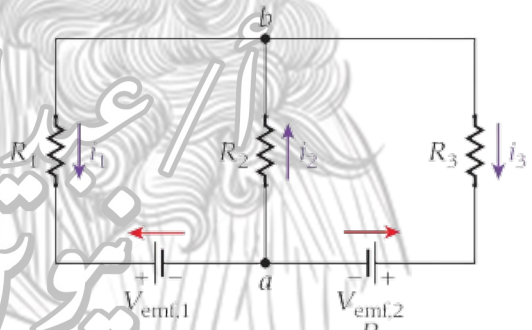
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Idea



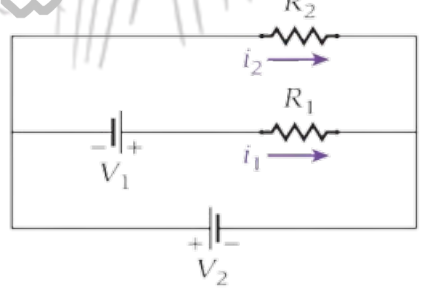
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Idea



101

Idea



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