Mohamed Hassaan

Revision

Chapter 1

Ohm's Law

Class sheet (1)

Summary

Quantity of Charges (Q)

$Q = n \times e^-$ | $Q = I \times t$ | $Q = \frac{W}{V}$

Electric Current (I)

$I = \frac{V}{R}$ | $I = \frac{Q}{t}$

Potential Difference (V)

$V = \frac{W}{Q}$ | $V = I R$

Resistance (R)

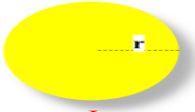
$R = \frac{V}{I}$ | $R = \rho_e \frac{L}{A}$

Resistivity (ρ_e) &Conductivity(σ)

$\rho_e = R \frac{A}{L}$ | $\sigma = \frac{1}{\rho_e}$

Remember

If a wire is coiled as a coil of (N) turns

Circular coil	$L_{wire} = 2\pi r_{coil} N$	
Square coil	$L_{wire} = 4 L N$	
Rectangular coil	$L_{wire} = 2 (L + w) N$	

Ratio between two resistors

$R = \rho_e \frac{L}{A}$ $\quad \frac{R_1}{R_2} = \frac{\rho_{e1}}{\rho_{e2}} \times \frac{L_1}{L_2} \times \frac{A_2}{A_1}$

$A = \pi r^2$ $\quad \frac{R_1}{R_2} = \frac{\rho_{e1}}{\rho_{e2}} \times \frac{L_1}{L_2} \times \left(\frac{r_2}{r_1}\right)^2$

$D = 2r$ $\quad \frac{R_1}{R_2} = \frac{\rho_{e1}}{\rho_{e2}} \times \frac{L_1}{L_2} \times \left(\frac{D_2}{D_1}\right)^2$

$R = \rho_e \frac{L^2 \rho}{m}$ $\quad \frac{R_1}{R_2} = \frac{\rho_{e1}}{\rho_{e2}} \times \left(\frac{L_1}{L_2}\right)^2 \times \frac{\rho_1}{\rho_2} \times \frac{m_2}{m_1}$

If a wire is stretched or reshaped or reformed or rewonded or drawn uniformly or compressed such that its the volume remains constant

$\frac{R_1}{R_2} = \left(\frac{L_1}{L_2}\right)^2$ $\quad \frac{R_1}{R_2} = \left(\frac{A_2}{A_1}\right)^2$ $\quad \frac{R_1}{R_2} = \left(\frac{D_2}{D_1}\right)^4$ $\quad \frac{R_1}{R_2} = \left(\frac{r_2}{r_1}\right)^4$

Remember

Increases or decreases to

Increases or decreases to → multiply by (n) or (1/n)

Ex: Area increase to double

$A_1 = A$ $\quad A_2 = 2A$

Ex: Area Decrease to Third

$A_1 = A$ $\quad A_2 = \frac{1}{3} A$

Increases or decreases By

Increases or decreases BY → $(1 \pm \frac{1}{n})$

Ex: Length increases by 80%

$L_1 = L$ $\quad L_2 = (1L + \frac{80}{100}L) = 1.8L$

Ex: Length Decreases by third

$L_1 = L$ $\quad L_2 = (1L - \frac{1}{3}L) = \frac{2}{3}L$

To find the percentage of change in resistance:

$\%\Delta R = \frac{R_2 - R_1}{R_1} \times 100$

The change of resistance becomes

$\Delta R = R_2 - R_1$

Resistors Connection

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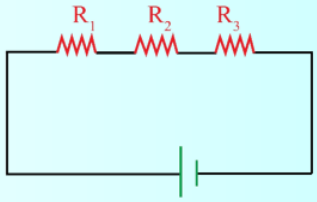
Series Connection



$I_T = I_1 = I_2 = I_3$ (Equal)

$V_T = V_1 + V_2 + V_3$

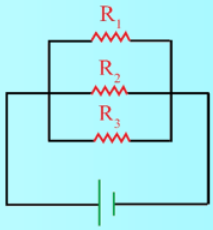
$R_{eq} = R_1 + R_2 + R_3$

Identical

$R_{eq} = N\,R$

$V_T = N\,V$

Parallel Connection



$I_T = I_1 + I_2 + I_3$

$V_T = V_1 = V_2 = V_3$ (Equal)

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$R_{eq} = \frac{R}{N}$$

$$R_{eq} = \frac{R_1 \times R_2}{R_1 + R_2}$$

Electric Energy and Power

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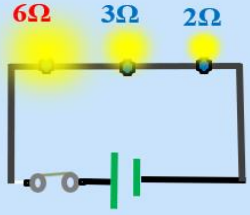
$$W = V\,I\,t = I^2\,R\,t = \frac{V^2}{R}\,t \quad \text{(Joule)}$$

$$P = V\,I = I^2\,R = \frac{V^2}{R} \quad \text{(Watt)}$$

Series Connection

(I) constant $\quad P = I^2\,R$

$P \propto R$



$$\frac{P_1}{P_2} = \frac{R_1}{R_2}$$

Parallel Connection

(V) constant $\quad P = \frac{V^2}{R}$

$P \propto \frac{1}{R}$

$$\frac{P_1}{P_2} = \frac{R_2}{R_1}$$

Ohm's Law for Closed Circuit
Reading of Devices

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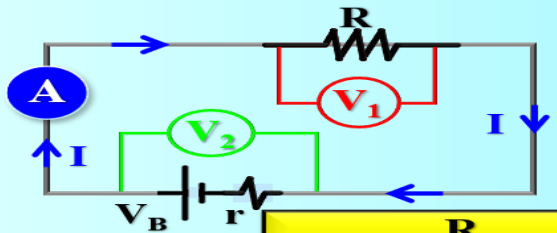
Ammeter

$$I = \frac{V_B}{(R_{eq} + r)}$$

$$R_T = R_{eq} + r$$



Voltmeter

$$V_1 = IR$$

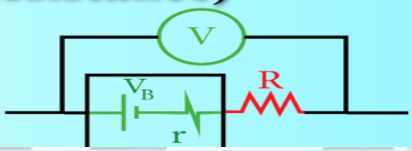
$$V_2 = V_B - Ir$$

Efficiency of the battery

$$\eta = \frac{R_{eq}}{(R_{eq} + r)} x100$$

Voltmeter across (Battery & Resistance)

$$V = V_B - I\,(r + R)$$



Ohm's Law for Closed Circuit
Reading of Devices

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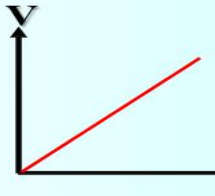
Reading of (V_1)

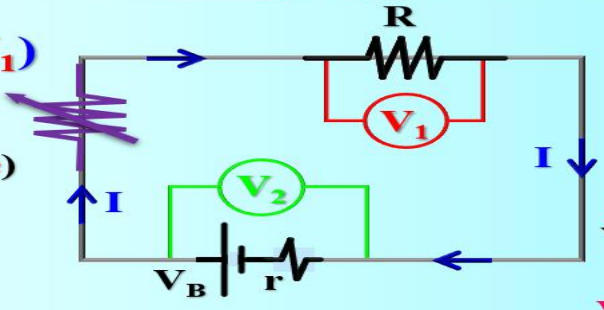
$$V_1 = IR$$

(across resistance)

Graph



Slope = R

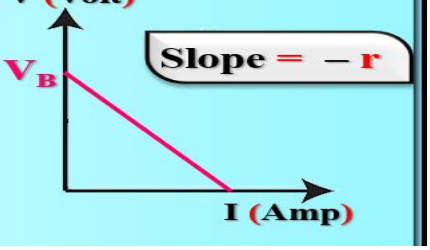


Reading of (V_2)

$$V_2 = V_B - Ir$$

(across battery)

Graph



Slope = − r

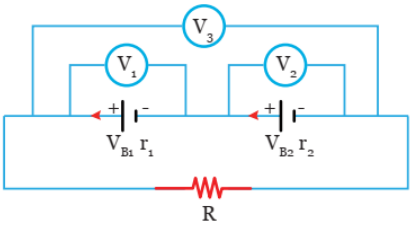
Exam 2024

Master Table

$V<V_B$	$V>V_B$	$V=V_B$	$V=0$
Source battery $V = V_B - Ir$ $I \neq 0$ and $r \neq 0$	Charged battery $V = V_B + Ir$ $I \neq 0$ and $r \neq 0$	Source and Charged battery $V = V_B - Ir$ (Source) $I = 0$ or $r = 0$ $V = V_B + Ir$ (charged) $I = 0$ or $r = 0$	Source battery $V = V_B - Ir$ (Source) $V_B = Ir$ $I = \frac{V_B}{R_{eq} + r} = \frac{V_B}{0 + r}$ $I = \frac{V_B}{r}$

Multiple Batteries connected in series

In same direction



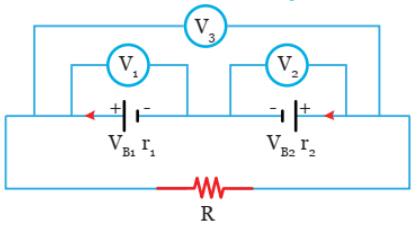
$$I_{total} = \frac{V_{B1} + V_{B2}}{R_{eq} + r_1 + r_2}$$

$V_1 = V_{B1} - Ir_1$ (Discharging case $V_1 < V_{B1}$)

$V_2 = V_{B2} - Ir_2$ (Discharging case $V_2 < V_{B2}$)

$V_3 = V_1 + V_2$

In opposite direction



$$I_{total} = \frac{V_{B1} - V_{B2}}{R_{eq} + r_1 + r_2}$$

$V_1 = V_{B1} - Ir_1$ (Discharging case $V_1 < V_{B1}$)

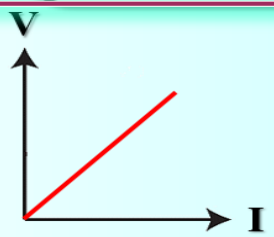
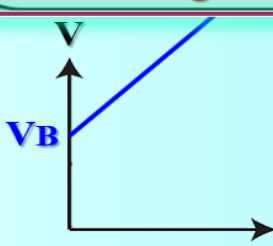
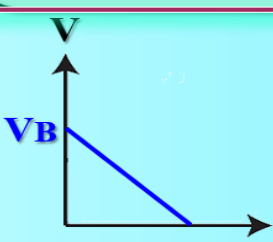
$V_2 = V_{B2} + Ir_2$ (Charging case $V_2 > V_{B2}$)

$V_3 = V_1 - V_2$

If $V_{B1} > V_{B2}$ so,

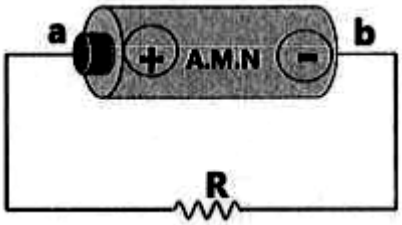
(V_{B1}) is a source battery, (V_{B2}) is a charged battery

Relation between the terminals of (V) & Current intensity (I)

Terminal voltage across Resistance	Terminal voltage across Charged Battery	Terminal voltage across Source Battery
		
$V = IR$	$V = V_B + Ir$	$V = V_B - Ir$
$R = \frac{V}{I}$	$r = \frac{V + V_B}{I}$	$-r = \frac{V - V_B}{I}$
Where (R) is slope	Where (r) is slope	Where (r) is slope
Slope (+ve) value	Slope (+ve) value	Slope (–ve) value

1) In the corresponding figure represents a simple electrical circuit, from the figure: is the conventional direction of the electric current inside the battery and through resistance R……

	The direction of the current inside the battery	**The direction of the current through R**
A	From a to b	From a to b
B	From b to a	From a to b
C	From a to b	From b to a

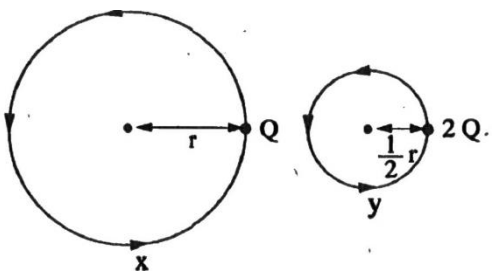


2) In a hydrogen gas electric discharge tube, 3×10^{18} electrons flow every second from left to right, and 2×10^{18} proton every second from right to left during a certain section, find the intensity and direction of the current during the section.

(A) 0.8A from rig. to left.
(B) 0.8A from rig. to right
(C) 0.5A from rig. to left
(D) 0.5A from rig. to right

3) In the two figures shown, two charges of magnitude Q, 2Q. They rotate at the same frequency in two circular paths x, y respectively, the ratio between the current intensities resulting from the rotation of the two charges (I_x/I_y)……..

(A) 1/1
(B) 1/2
(C) 2/1
(D) 4/1



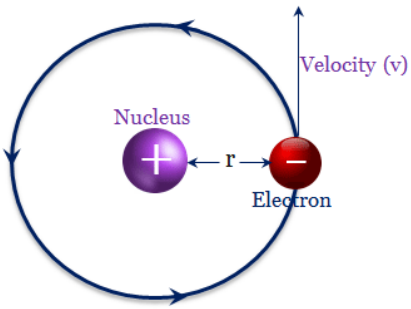
4) Based on Bohr's model for the hydrogen atom, the electron moves in a circular path of radius 0.53 Å with a speed of 2.2 x 10^6 m/s, then the current intensity due to the motion of the electron equal..

(A) 3.141mA

(B) 6.282mA

(C) 1.166mA

(D) 1.057mA



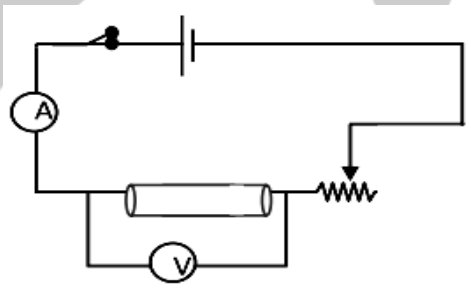
5) The following table gives the current I (in amperes) through two devices for several values of potential difference V (in volts). From these data, which of the following raw indicates the correct statement?

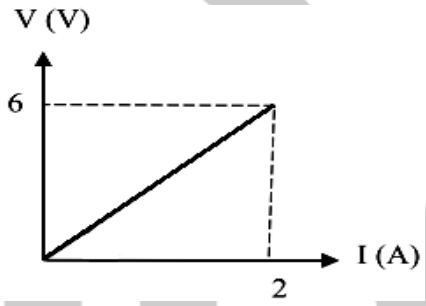
	Device (1)	Device (2)
A	Obeys Ohm's law	Does not obey Ohm's law
B	Does not Obeys Ohm's law	Obeys Ohm's law
C	Obey Ohm's law	Obeys Ohm's law
D	Does not obey Ohm's law	Does not obey Ohm's law

Device (1)	
V	**I**
2	1.5
3	2.3
4	3.2

Device (2)	
V	**I**
2	4.5
3	6.75
4	9

6) In an experiment to determine the resistance of a long aluminum wire with cross-sectional area $1mm^2$ wound on a reel, a student connected the two ends of the wire in the electrical circuit shown in the opposite figure and drew the graphical relationship between the potential difference between the two ends of the wire (V) and the intensity of the current passing through it (I), knowing that the temperature and length of the wire is constant and specific resistance of aluminum is 2.4×10^{-8} Ω.m. **Find** the length of the wire.





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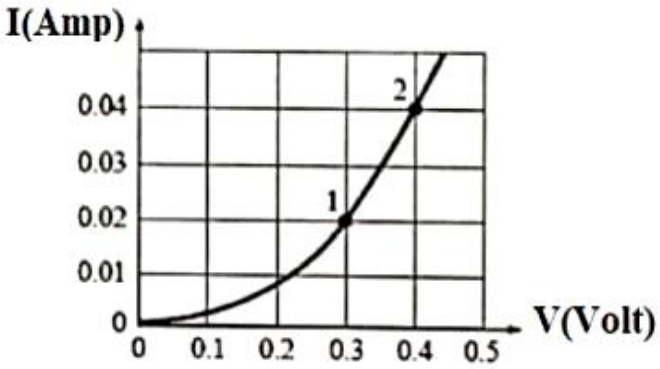
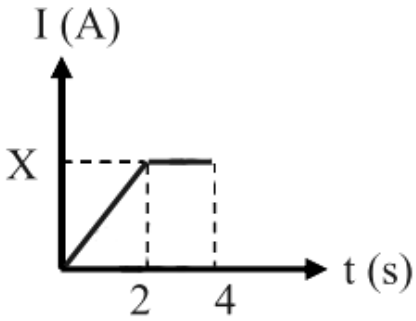
7) An electric device has a current (I) and voltage (V) graph shown which statement describe this device



(A) The resistance at point (1) is 15Ω and device obey ohm's law
(B) The resistance at point (2) is 10Ω and device doesn't obey ohm's law
(C) The resistance at point (1) is 0.067Ω and device doesn't obey ohm's law
(D) The resistance of device between interval (1) and (2) obeys obey ohm's law

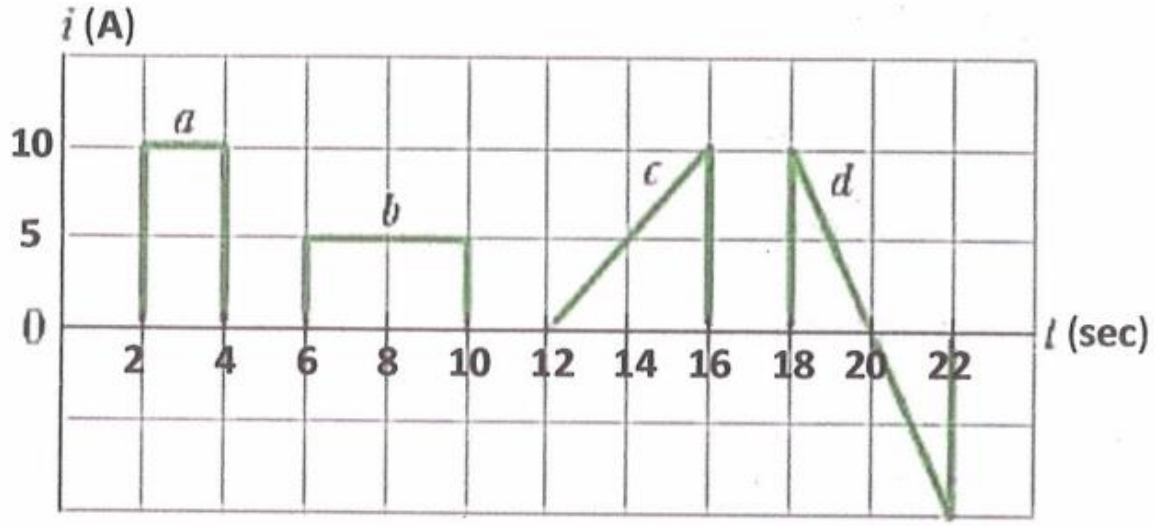
8) Main book 2024

The opposite figure represents the graphical relationship between the intensity of the electric current (I) passing through a section of a conductor and the time (t) during a time period of 4s. If the electric charge passing through the conductor during that time period is equal to 21C. the value of **X**.



(A) 7 A
(B) 24A
(C) 32 A
(D) 14 C

9) The graphs a, b ,c and d Find the net electric charges (Q) that passes through conductor of resistance 10Ω in all durations a, b ,c and d



Different waveforms are applied on the same conductor

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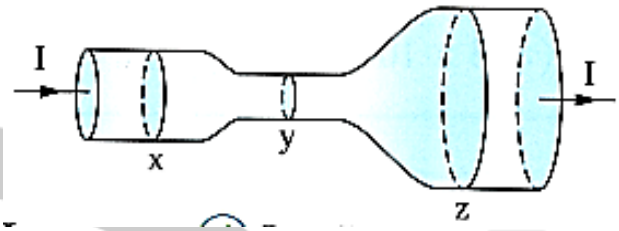
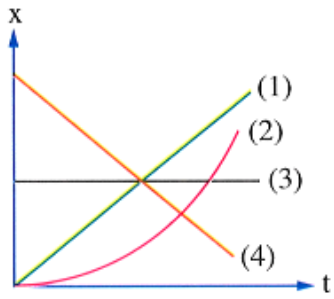
10) The opposite diagram shows a section of a conductor that is carrying an electric current, so which of the following choices shows the relation among current intensities at the cross-sections x, y and z?



(A) $I_X > I_Y > I_Z$
(B) $I_X = I_Y = I_Z$
(C) $I_X < I_Y > I_Z$
(D) $I_X < I_Y < I_Z$

11) The opposite graph represents the relation between x a physical quantity (x) and time (t), so the appropriate graphical representation of the relation between (x) and (t) if quantity (x) is:



(i) The potential difference across the terminals of a conductor carrying a direct current is..

(A) (1)
(B) (2)
(C) (3)
(D) (4)

(ii) The consumed electric energy in a conductor carrying a direct current is ….

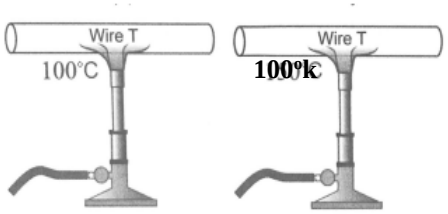
(A) (1)
(B) (2)
(C) (3)
(D) (4)

(iii) The consumed electric power in a conductor carrying a direct current is ..... .

(A) (1)
(B) (2)
(C) (3)
(D) (4)

12) The current through the copper wire (T) w found to be 5A at 100°C and then the temperature of heater will change to 100°k If the wire (T) connected with the same battery in the two cases, so

	The resistance of the wire (T) in the second case	The electric current of the wire (T) in the second case
A	Decreases	Increases
B	Increases	Decreases
C	Remains constant	Remains constant
D	Increases	Increases



13) A metallic wire has length 1 m cross-sectional area 20 mm^2 and electric resistance 0.055 Ω, of which metal from the opposite table is this wire made?

(A) Copper
(B) Iridium-platinum
(C) Aluminum
(D) Nickel-chromium

Metal	Resistivity (Ω.m)
Copper	1.7×10^{-8}
Aluminum	2.82×10^{-8}
Iridium-platinum	3.3×10^{-7}
Nickel-chromium	11×10^{-7}

14) A wire of a cross section area $2x10^{-6}m^2$ and its resistivity $2x10^{-7}\Omega.m$ is coiled in the form of a circular coil of radius 0.3181m and 100 turns. The terminals of the wire are connected to an electric source of 200V. Calculate the electric current passes through the wire

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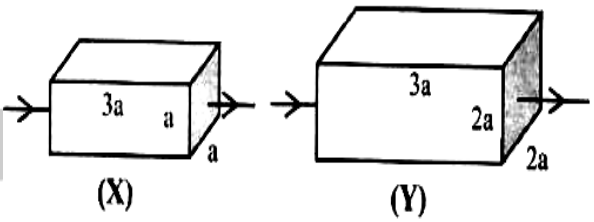
15) If the current increase to double then the resistance of the circuit would be:

(A) Increase to double
(B) Decrease to half
(C) Unchanged
(D) Increase to 4 times

16) If the resistance increases to double then the electric current through the circuit would be:

(A) Increase to double
(B) Decrease to half
(C) Unchanged
(D) Increase to 4 times

17) Two conductors (X, Y) of the same material. Their dimensions are as shown in the drawing, so if the resistance of the conductor (X) is 12Ω.

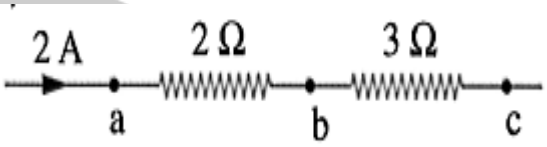


Find the resistance of the conductor (Y).

(A) 3Ω
(B) 6Ω
(C) 1Ω
(D) 4 Ω

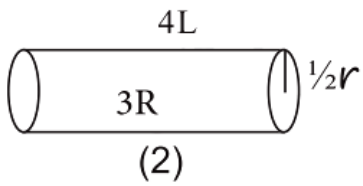
18) The opposite diagram represents a section of an electric circuit. **Calculate** the ratio between the work done for transferring a certain electric charge from point a to point b and the work done for transferring the same electric charge from point b to point c (W_{ab}/ W_{bc}).

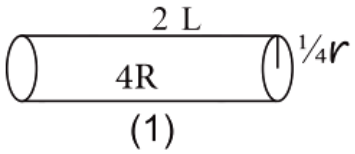
(A) 2/3
(B) 3/2
(C) 4/9
(D) 9/4

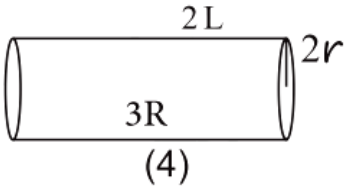


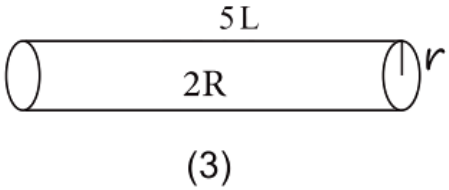
19) **Exam2023 1st session**

All of the following wires are made of the different material but are different sizes. **Identify** the wire with the highest electrical conductivity :



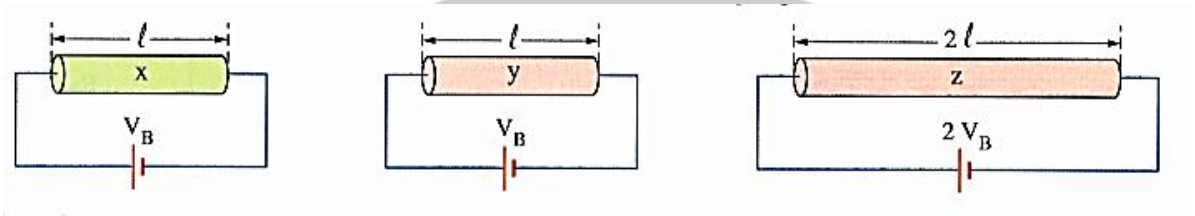






ⓐ wire 1 ⓑ wire 2 ⓒ wire 3 ⓓ wire 4

20) Three conductors x, y and z of the same cross-sectional area are made of different materials of conductivities σ, 2 σ and 2σ respectively and each of them is connected to a battery of negligible internal resistance as the following figures:



Therefore, the ratio of

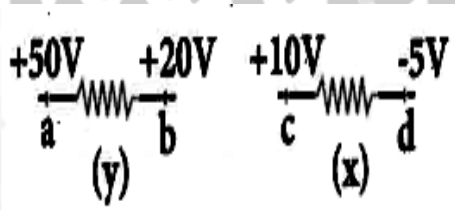
(i)The current intensities through the conductors (I_X: I_Y: I_Z) equals…

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

(ii)The consumed electric powers in the conductors ((PW)X: (PW)Y: (PW)Z) equals ..

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

21) The opposite figure represents two conductors (x) & (y), so if the work done between points (a & b) is twice the work done between (c & d). calculate the ratio between the amount of charge passing through the conductor (x) to the amount of charge passing through the conductor (y).



(A) 1/1
(B) 1/2
(C) 1/3
(D) 1/4

22) Main Book 2024

Two conductors of different metals and the same length. If the same current passing through them the potential difference between its terminals will be equal. If $((\rho_{e1}/\rho_{e2}) = 4/9)$. the ratio (r_1 / r_2) is.

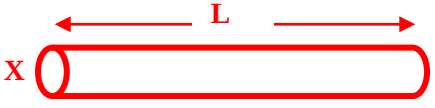
(A) 3/2
(B) 2/3
(C) 4/9
(D) 9/4

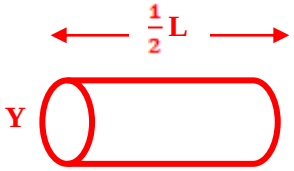
23) Egypt exams

You have two wires (A) and (B) of the same material, the length of the wire (A) is double of the wire (B), if the ratio between resistance of that wire (A) and that of (B) is 8 and the diameter of the wire (A) is 4mm. Then the cross-sectional area of wire (B). Knowing that: ($\pi = 3.14$)

(A) $8\times10^{-5}m^2$
(B) $5\times10^{-5}m^2$
(C) $0.5\times10^{-5}m^2$
(D) $50\times10^{-5}m^2$

24) In the figure shown two wires x, y of the same material, if the mass of the wire x is 5gm and the mass of the wire is 10gm, then the ratio of the resistances of the two wires (R_x/ R_y).





(A) 2/1
(B) 4/1
(C) 8/1
(D) 16/1

25) A silver wire with a resistance of 1Ω and a manganese wire whose length is 1/3 the length of the manganese wire and also its radius is 1/3 radius of manganese. If the specific resistance of manganese is equal to 30 times the specific resistance of silver. Find the resistance of the manganese wire.

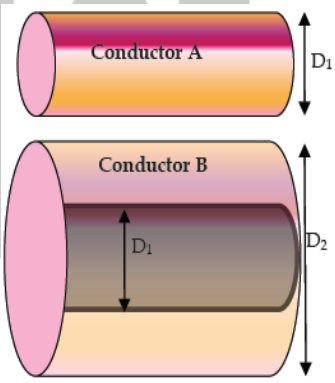
(A) 90Ω

(B) 30Ω

(C) 20Ω

(D) 10Ω

26) Two conductors of the same material and length have different resistances. Conductor (A) is a solid 1mm diameter wire. Conductor (B) is a tube of inner diameter 1mm and outer diameter 2mm. Find the ratio of the resistances of conductor (A) to conductor (B).



(A) 3/1

(B) 1/3

(C) 1/9

(D) 9/1

27) Pulling a wire reduces the diameter of its cross section by 5% of its original diameter. What is the percentage increase in its resistance?

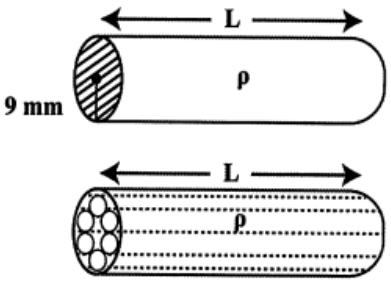
(A) 10.8%

(B) 22.77%

(C) 5.5%

(D) 18.55%

28) An aluminum cable of radius 9mm and resistance 5Ω is replaced by another cable of 6 thin aluminum wires each of radius 3mm and of same length. Find the resistance of the second cable?



(A) 5Ω
(B) 7.5Ω
(C) 6Ω
(D) 9Ω

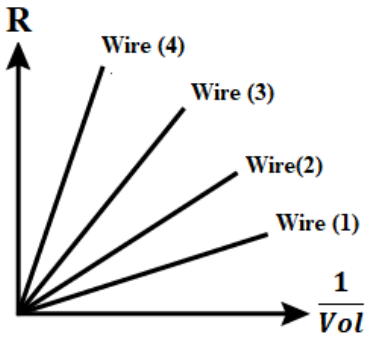
29) A wire of resistance R is stretched so its length increases by 50% Initial length then the change of resistance becomes ……

(A) $\frac{5}{4}R$
(B) $\frac{9}{4}R$
(C) R
(D) $\frac{4}{5}R$

30) A wire of resistance R and Diameter (D) is compressed to become Diameter ND then the resistance becomes…..

(A) $\frac{R}{N^2}$
(B) $\frac{R}{N}$
(C) NR
(D) $\frac{R}{N^4}$

31) Exam2021 1st session

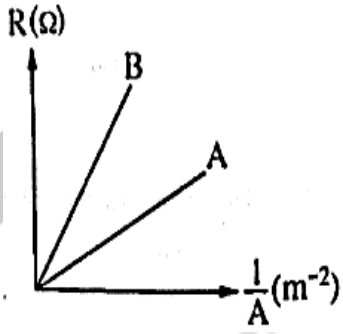


The corresponding figure shows the relationship between the resistance (R)of a of several wires made of different materials of the same length and the reciprocal of their sizes $\left(\frac{1}{Volume}\right)$, so the order of electrical resistivity (ρ_e) of the materials from which the wires are made is

(A) $\rho_{e1} \succ \rho_{e2} \succ \rho_{e3} \succ \rho_{e4}$
(B) $\rho_{e4} \succ \rho_{e3} \succ \rho_{e2} \succ \rho_{e1}$
(C) $\rho_{e3} \succ \rho_{e4} \succ \rho_{e2} \succ \rho_{e1}$
(D) $\rho_{e3} \prec \rho_{e4} \prec \rho_{e1} \prec \rho_{e2}$

32) Experimental exam 2023

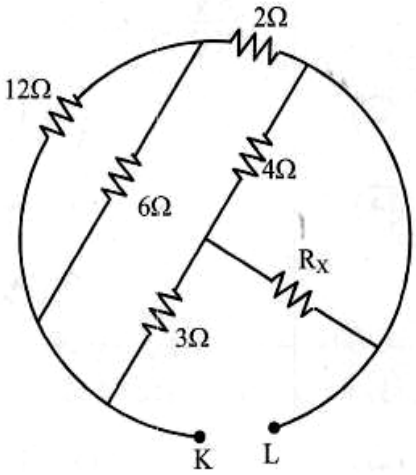
Two different wires A and B having the same which equation of the wire conductivity is correct……



	According to the resistivity	According to the conductivity	According to the cross-sectional are
A	$\rho_B > \rho_A$	$\sigma_B < \sigma_A$	$A_B > A_A$
B	$\rho_A < \rho_B$	$\sigma_A = \sigma_B$	$A_A > A_B$
C	$\rho_A > \rho_B$	$\sigma_B > \sigma_A$	$A_A < A_B$
D	$\rho_A < \rho_B$	$\sigma_A = \sigma_B$	$A_A = A_B$

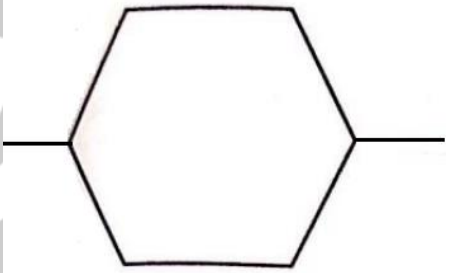
33) Exam2023 1st session

The opposite figure represents part of an electrical circuit. if the equivalent resistance value between L and K is 3Ω. **Find** the value of R_X…….Ω



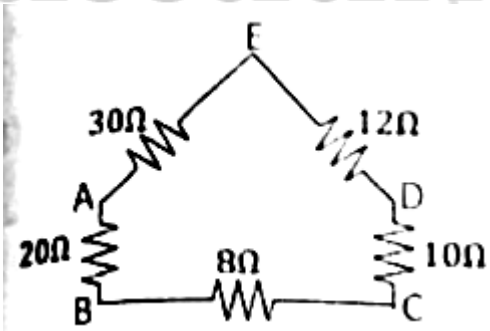
(A) 10
(B) 12
(C) 18
(D) 20

34) A regular hexagon as shown in the opposite figure. If you know that the equivalent resistance of the shape when connected in the shown way is 18Ω, the resistance of each side…….Ω



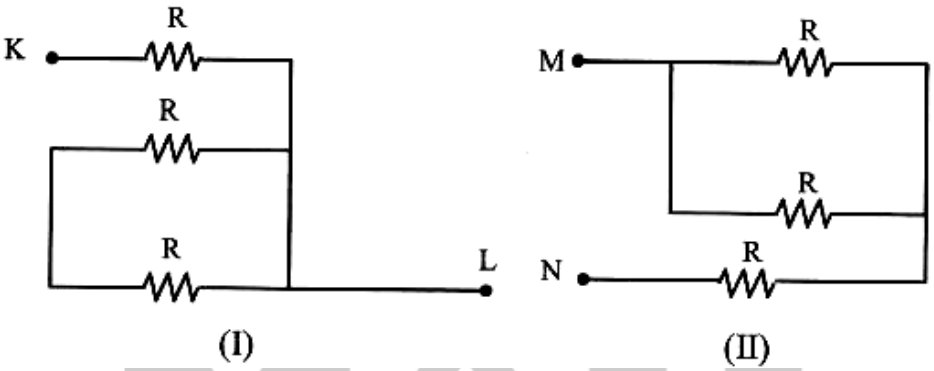
(A) 12
(B) 18
(C) 20
(D) 10

35) A pentagonal polygon whose sides ABCDE have resistances connected to its sides of 20, 8, 12, 10 and 30 ohms respectively. Which of its sides are connected to a battery so that the total resistance is as small as possible?



(A) D, B
(B) C, E
(C) A, E
(D) B, C

36) In Figure (I) if the equivalent resistance between the two points (K, L) is R_1. In Figure (II) if the equivalent resistance between the two points (M, N) is R_2. Find the ratio (R_1/R_2). **(2/3)**



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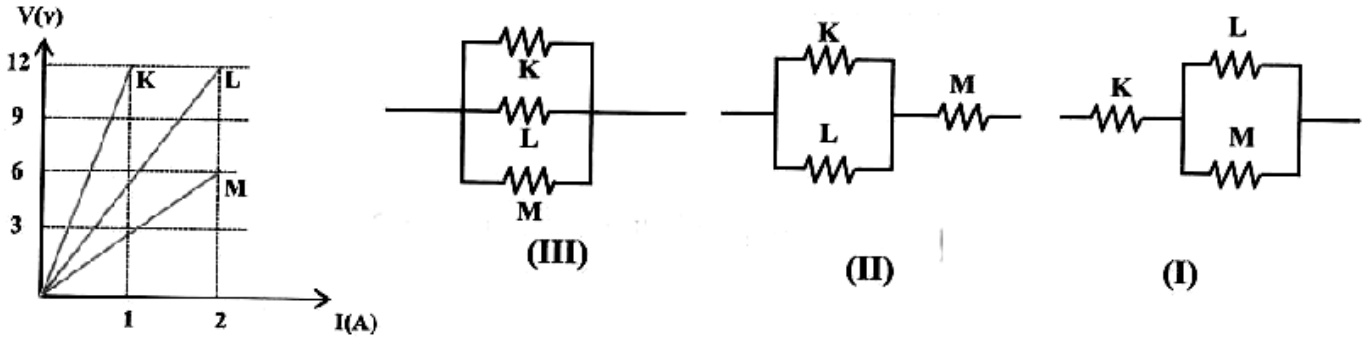
37) The opposite graph represents the relationship between potential differences and the intensity of the current passing through three M, L, K resistors, when the resistors are connected in the following forms. **Arrange** the resistors in ascending order.



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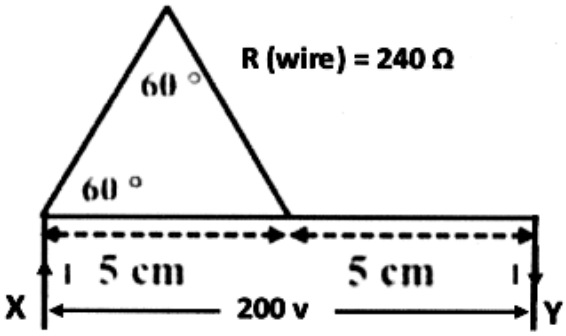
38) A regular nickel-chrome wire of total resistance R = 240Ω. The wire is formed to take the opposite shape. **the** value of current (I).



(A) 2A

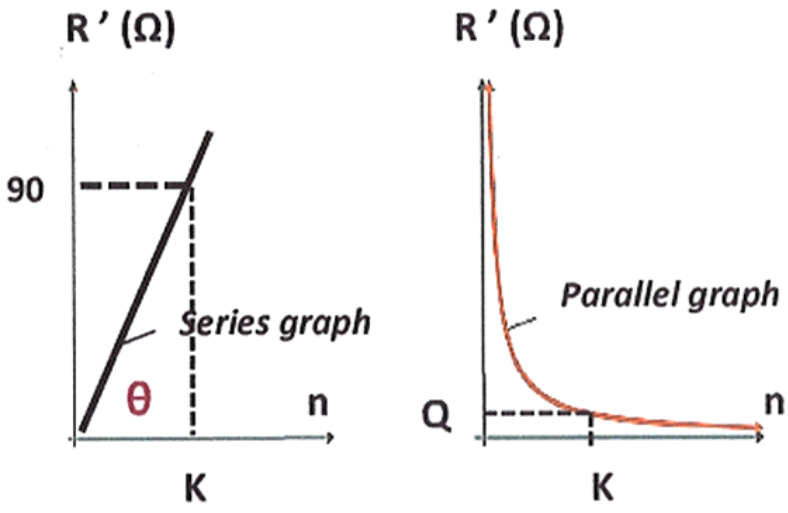
(B)3A

(C) 4A

(D)0A

39) The opposite figure Two graphs, each represents the relation between equivalent resistance R' (Ω) versus number of identical resistor R (Ω).(Series - graph) represents series connection.(Parallel - graph) represents parallel connection.

If θ= 88.091 ° So, Q = - - - - (Ω)



(A) 30

(B) 20

(C) 50

(D) 10

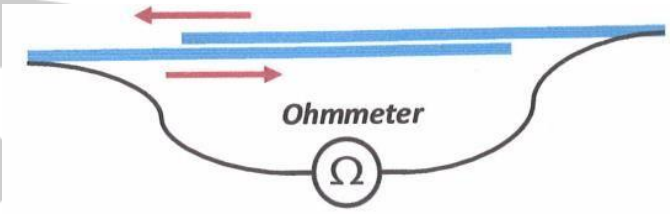
40) Two identical regular conductors each of R (Ω) are completely in contact and sliding smoothly with each other **So,** Ratio between possible maximum resistance to than minimum possible resistance R_{max}/R_{min}

(A) 4

(B) 5

(C) 1/4

(D) 1/2



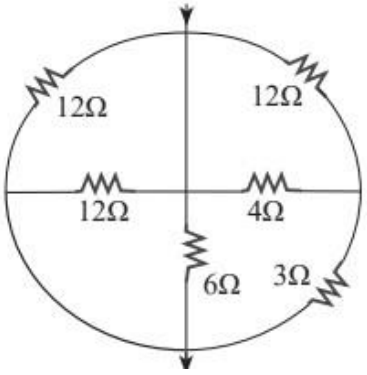
41) In opposite figure the equivalent resistance is….

(A) 2 Ω

(B) 9 Ω

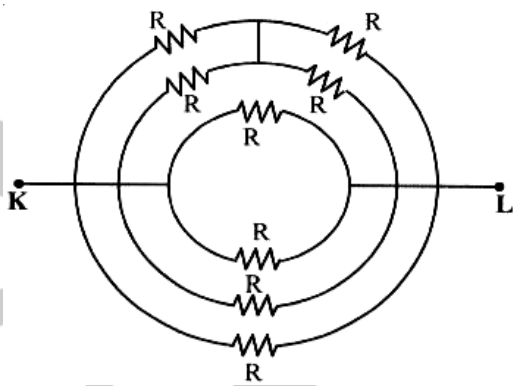
(C) 3 Ω

(D) 1 Ω



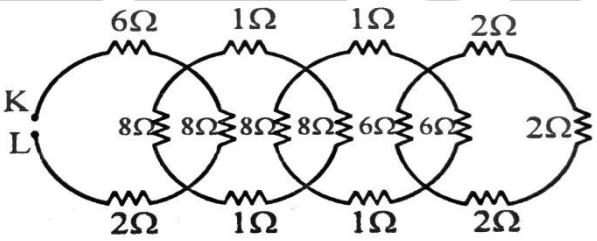
42) In the opposite figure, if R equals 15Ω. **Find** the equivalent resistance value between L and K?

(A) 5Ω
(B) 6Ω
(C) 7Ω
(D) 8Ω



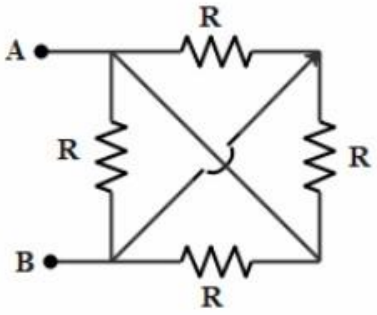
43) The equivalent resistance from K to L is…….

(A) 8Ω
(B) 10Ω
(C) 12Ω
(D) 14Ω



44) In opposite figure the equivalent resistance between A&B is:

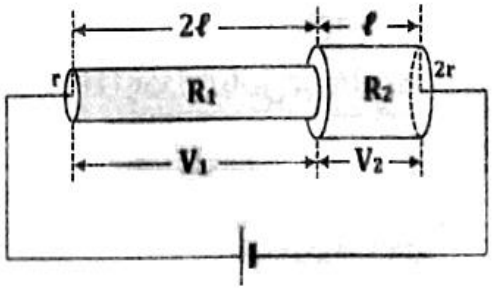
(A) R/2
(B) R
(C) 0
(D)R/4



45) Multiple identical resistors of number (n), the resistance of each of them is (R), are connected together in series, hence their equivalent resistance equals (X) but when they are connected in parallel, the value of their equivalent resistance becomes (Y), so (R) equals

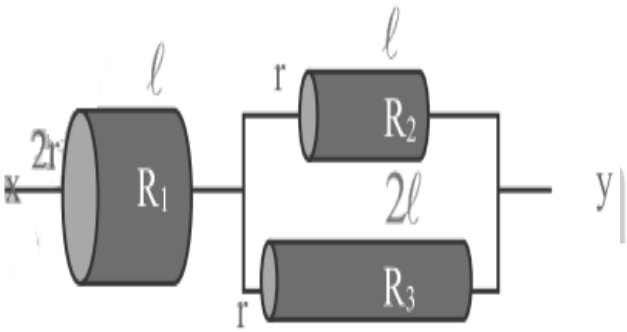
A) XY
B) X-Y
C) X+Y
D) $\sqrt{XY}$

46) Two conductors of the same material are connected as shown in the figure, the ratio V_1/V_2…….



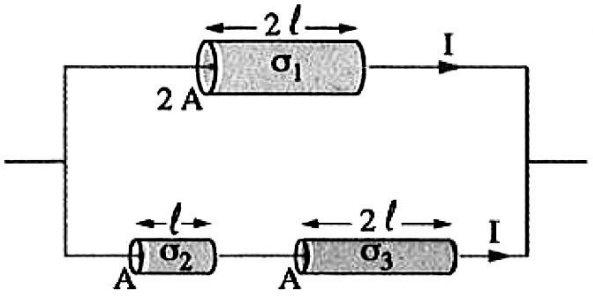
(A) 4/1
(B) 8/1
(C) 1/4
(D) 1/8

47) In the opposite figure, there are three different regular sections of a metal wire. If the value of R_1 is equal to 3Ω. Find the equivalent resistance value between x, y.



(A) 11 Ω
(B) 12 Ω
(C) 10 Ω
(D) 14 Ω

48) The opposite figure represents part of an electric circuit that contains three conductors of different materials connected together, and a current of intensity I passes through each of them. So……



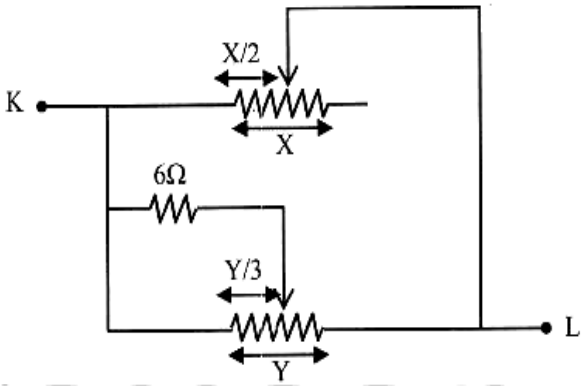
(A) $\sigma_1 = \sigma_2 + \sigma_3$

(B) $1/\sigma_1 = 1/\sigma_2 + 1/\sigma_3$

(C) $\sigma_1 = \sigma_2 + \sigma_3/2$

(D) $1/\sigma_1 = 1/\sigma_2 + 2/\sigma_3$

49) The opposite figure represents part of an electrical circuit. If the resistance value X is 16Ω and the resistance value Y is 9Ω. the total resistance value between the two points K and L.



(A) 2 Ω

(B) 10 Ω

(C) 3 Ω

(D) 4 Ω.

50) Exam2021 **1st session**

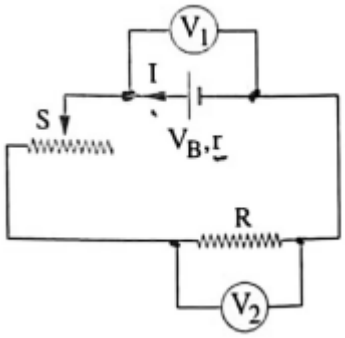
In the opposite figure the ratio V_1/V_2 ……..

(A) $\frac{V_B - Ir}{IR}$

(B) $\frac{IR}{V_B - IR}$

(C) $\frac{IR - Ir}{V_B}$

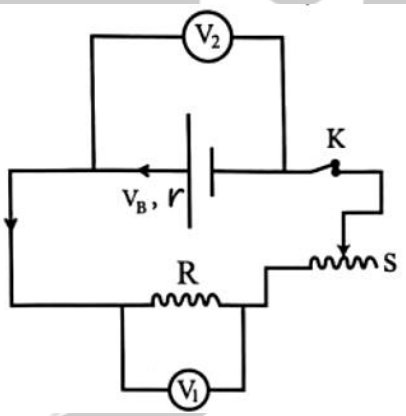
(D) $\frac{V_B + Ir}{IR}$



51) Exam2023 2nd session

In the shown **closed** electric circuit: we can conclude that

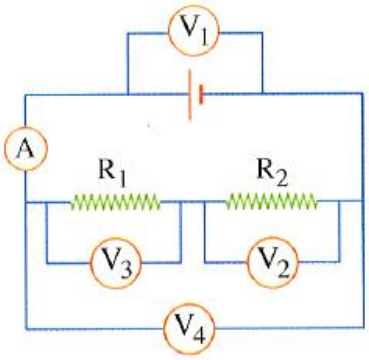
(A) $V_1 > V_B$
(B) $V_2 < V_B$
(C) $V_1 = V_2$
(D) $V_2 = V_B$



52) Final Exams (2nd Session-23)

In the shown electric circuit: **Which** readings of those voltmeters are equal?

(A) V_2, V_3
(B) V_2, V_4
(C) V_2, V_1
(D) V_1, V_4



53) Two electric kettles A and B are used to boil the same amount of water m (kg).

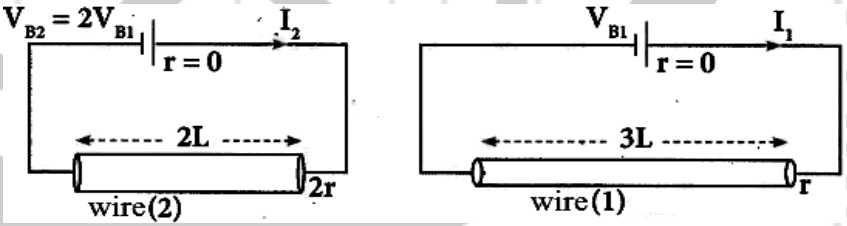
If kettle A takes t_1 =100 sec kettle B takes ta =125sec ratio of R_A/R_B = meanwhile SO, where R is the ohmmic value of heating element **(Negelct infra-red radiation energy)**

(A) 0.8
(B) 0.5
(C) 0.2
(D) 1

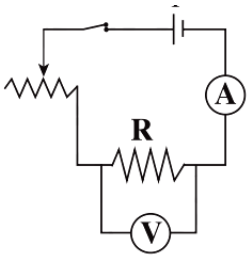
54) Exam2022 1st session

In the opposite figure two wires (1) and (2) are made of the same material. The length of the wire (1) is equal to (3L) and its radius is (r), while the length of the wire (2) is equal to (2L) and its radius is (2r). Find the ratio between (I_1/I_2).

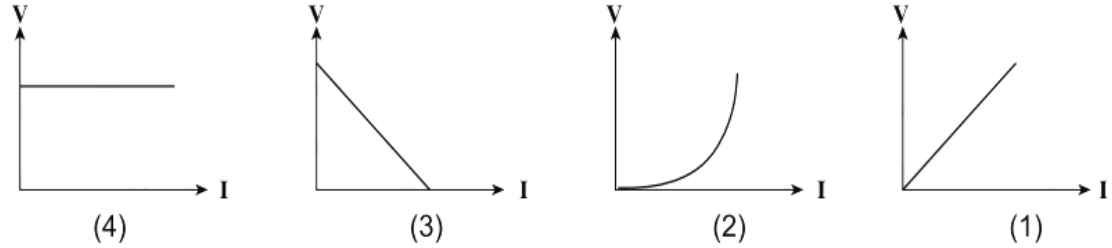
(A) $\frac{1}{12}$
(B) $\frac{12}{1}$
(C) $\frac{3}{2}$
(D) $\frac{1}{6}$



55) Exam2023 1st session

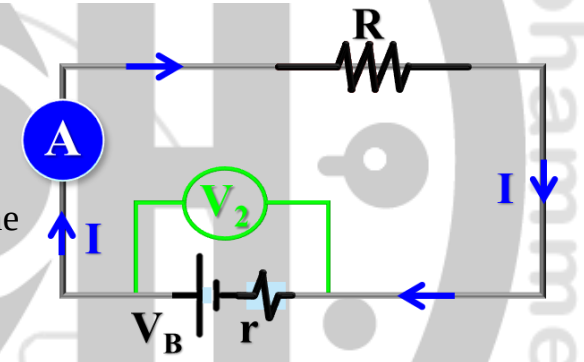


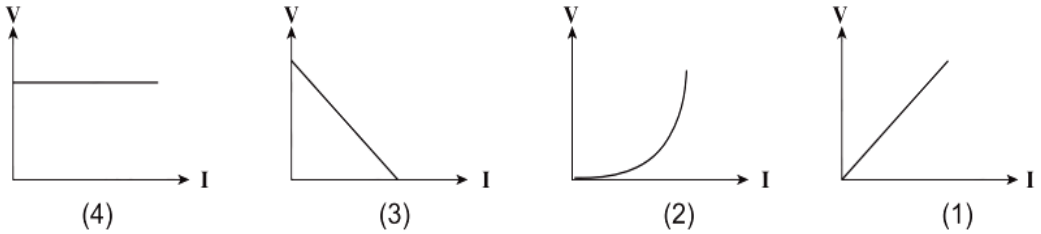
Which graph represents the correct relation between the electric potential difference between the terminals of the fixed resistance and the ammeter reading at the same temperature?



ⓐ 2 ⓑ 4 ⓒ 3 ⓓ 1

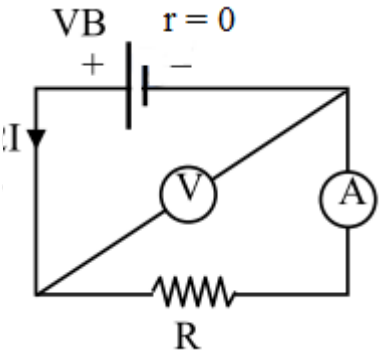
56) Which graph represents the correct relation between the electric potential difference between the terminals of the fixed resistance and the ammeter reading at the same temperature?

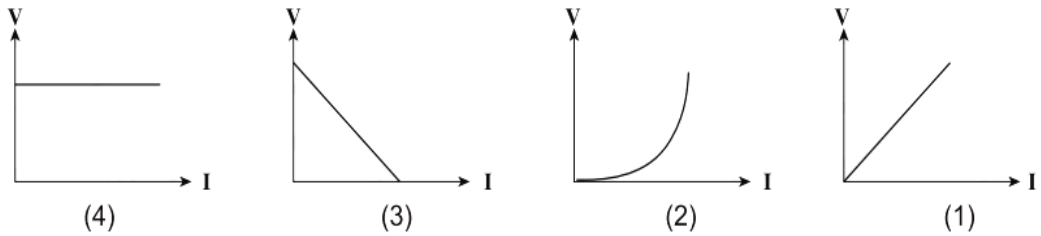




ⓐ 2 ⓑ 4 ⓒ 3 ⓓ 1

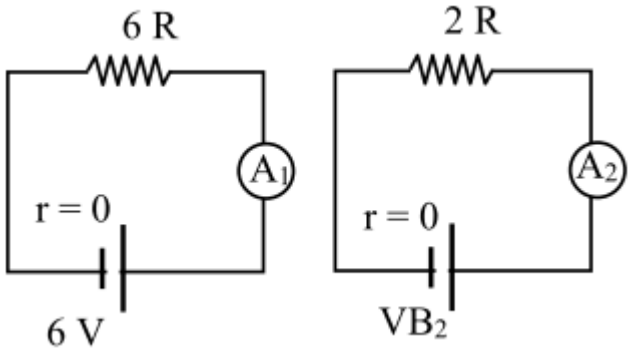
57) Which graph represents the correct relation between the electric potential difference between the terminals of the fixed resistance and the ammeter reading at the same temperature?





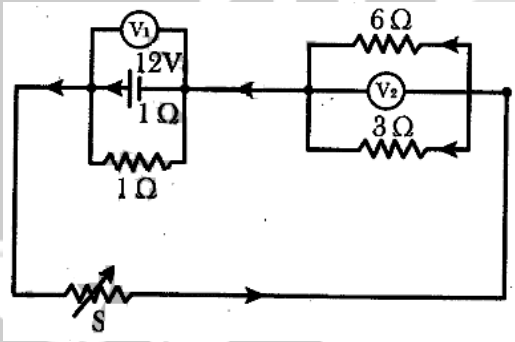
ⓐ 2 ⓑ 4 ⓒ 3 ⓓ 1

58) In the two electrical circuits shown in the figure opposite, if the ratio between the two ammeters readings is (I_1/I_2 = 1/12). Calculate the value of (VB).



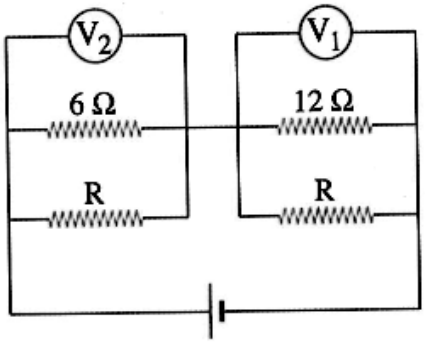
(A) 24V
(B) 25V
(C) 26V
(D) 27V

59) From the opposite figure. The value of V_1 and V_2 when S = 0 is.....



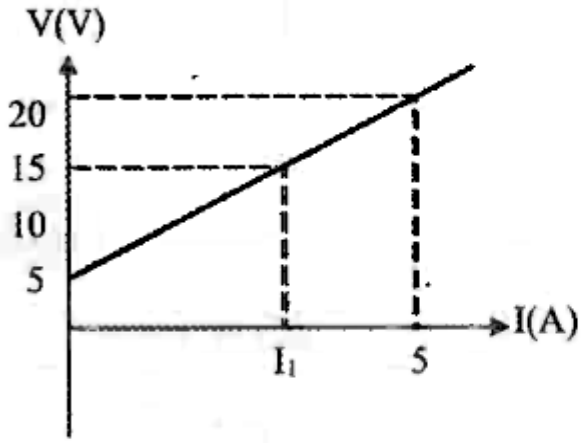
(A) 4.8V, 4.8V
(B) 12V, 4.8V
(C) 4.8V, 12V
(D) 0V, 4.8V

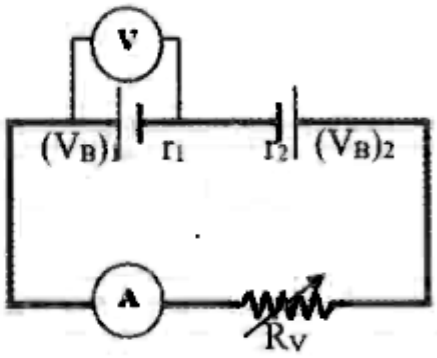
60) In the opposite electric circuit, if the ratio between the readings of the two voltmeters (V_1/V_2 = 4/3). Find the resistance of R.



(A) 6Ω.
(B) 7Ω
(C) 8Ω
(D) 7Ω

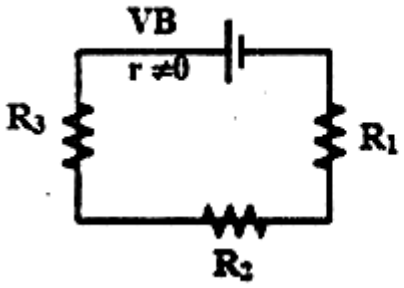
61) The opposite graph represents the relation between reading of voltmeter and reading of ammeter from the opposite circuit. **Then the** value of ……

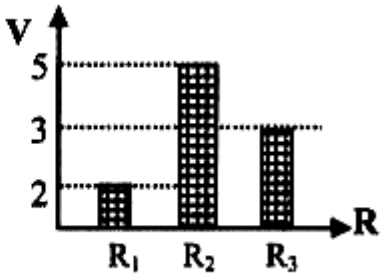




	Value of (r_1)	Value of (I_1)
A	3Ω	1/3A
B	2Ω	5/3A
C	5Ω	10/3A
D	3Ω	10/3A.

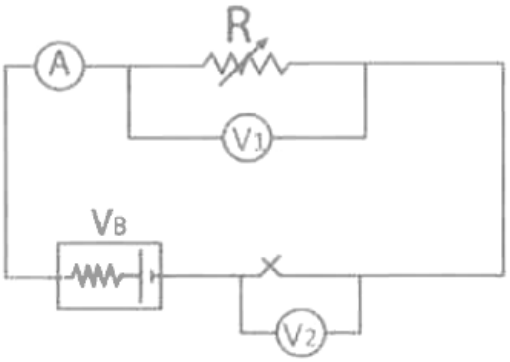
62) An electrical circuit containing a battery and three connected resistors (R_1, R_2, R_3) as in the figure. The internal resistance of the battery was equal to R_1. The graph expresses the voltage difference values for each of the resistors. **The** e.m.f of the battery…..





(A) 12V
(B) 10V
(C) 5V
(D) 2V

63) A circuit as shown in the figure consisting of a 15V battery and a resistor External 2.7Ω and a switch. If the internal resistance of the battery is 0.3Ω,the reading of two voltmeters will



(assuming The resistance of a voltmeter is infinite)

First the switch is open,

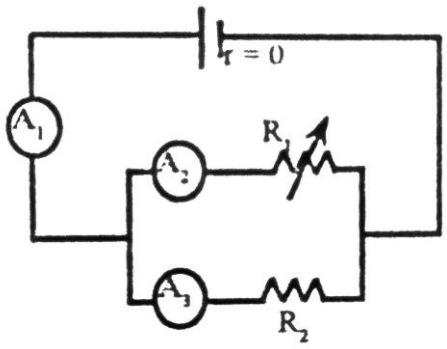
	The reading of (V_1)	The reading of (V_2)
A	0V	15V
B	15V	0V
C	10V	15V
D	5V	15V

64) For pervious question the reading of two voltmeters will

Second The switch is Closed,

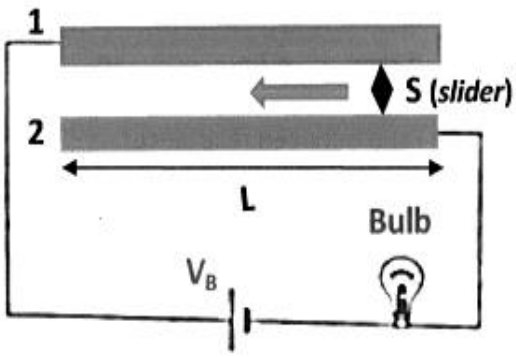
	The reading of (V_1)	The reading of (V_2)
A	15V	0V
B	13.5V	0V
C	0V	15V
D	0V	15V

65) The circuit shown; as R_1 is decreased, So…….



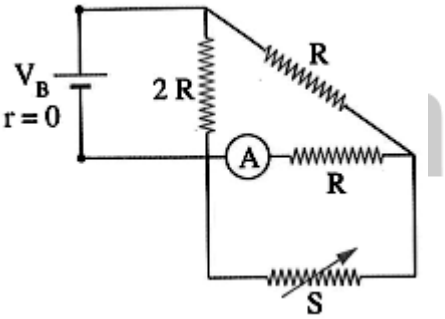
(A) Readings of A_1, A_2 and A_3 all increase
(B) Readings of A_1, A_2 increase, and A_3 decreases
(C) Readings of A_1, A_2 increase, and A_3 unchanges.
(D) Readings of A_1, A_2 and A_3 all decrease

66) Two parallel conductors 1 and 2 having the same material, lengths L and cross-sectional area A are both linked with a slider S between them, as shown in the figure. If the slider S is driven leftward as shown. What will happen to brightness of the bulb?



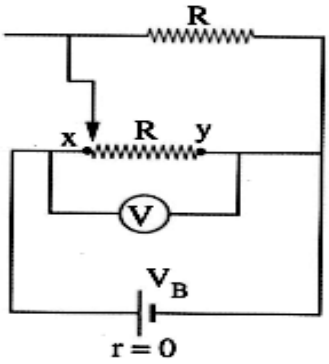
(A) Increase
(B) Unchanged.
(C) Decrease
(D) No correct answer

67) In the opposite circuit, when increasing the variable resistance S, What will happen to the reading of the ammeter?



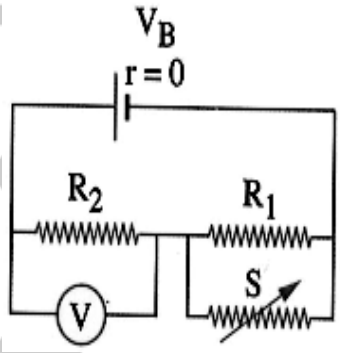
(A) Increased
(B) Decreased
(C) Not affected
(D) No correct answer

68) In the opposite circuit, if the sliding contact of the rheostat is moved from point x to point y. What will happen to the reading of the voltmeter?



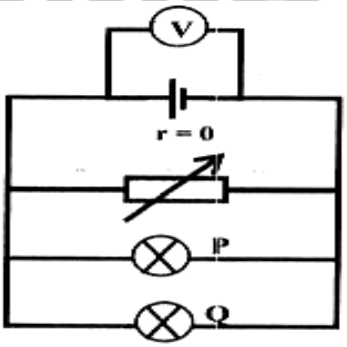
(A) Increased
(B) Decreased
(C) Not affected
(D) No correct answer

69) In the opposite circuit, when increasing the variable resistance S, What will happen to the reading of the voltmeter?



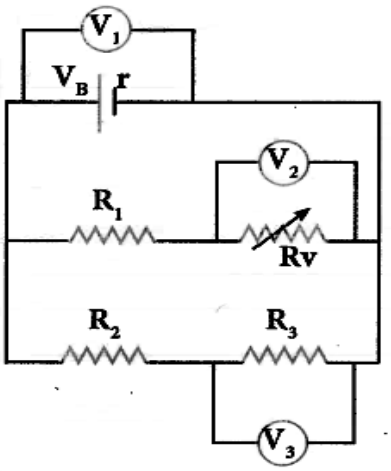
(A) Increased
(B) Decreased
(C) Not affected
(D) No correct answer

70) In the opposite circuit, when increasing the variable resistance. **What** will happen to the brightness of bulb (Q, P)?



(A) Decreased
(B) Not affected
(C) No correct answer
(D) Increased

71) In the opposite circuit, when decreasing the variable resistance. What will happen to V_1, V_2, V_3?



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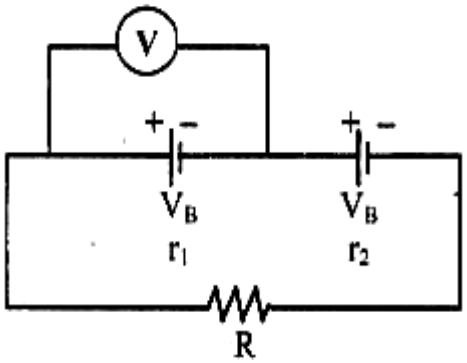
72) In the opposite circuit, if reading of voltmeter is zero. **Find** the value of R in of terms (r_1, r_2).



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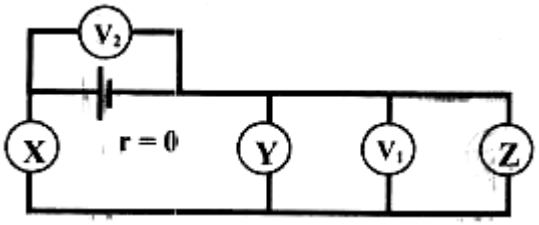
73) In the opposite electrical circuit. If the bulb Y burns out. What will happen to?

a) Brightness of bulbs Z, X.

b)Reading of voltmeters V_1, V_2



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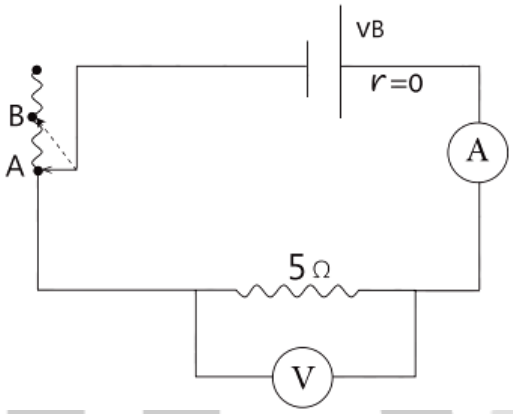
74) **Exam2023 1st session**

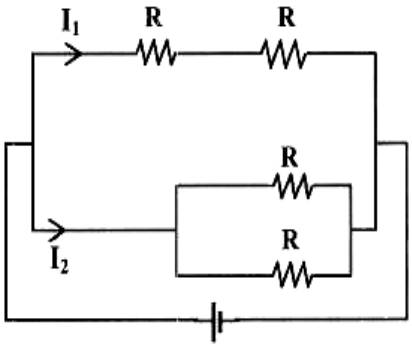
In the electric circuit, if the voltmeter | reading when the slider of the rheostat is at (A) was 12V. And when the slider is moved to point (B) the voltmeter reading was3V the value of the resistance taken from the rheostat is …..

(A) 20Ω
(B) 25Ω
(C) 30Ω
(D) 15Ω

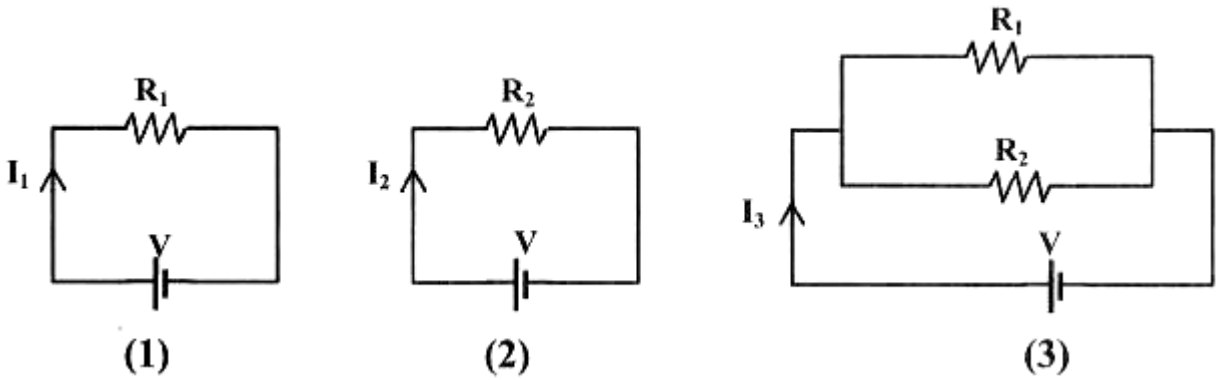


75) In the opposite electrical circuit. If the resistances are equal and the value of each is (R).Find the ratio (I_1/I_2).

(A) 1/4
(B) 4/1
(C) 1/16
(D) 16/1



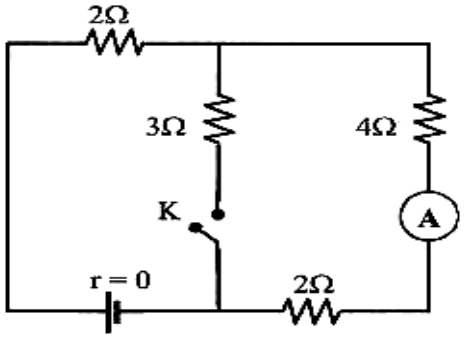
76) From the opposite figures. In Figure (1) if $I_1 = I$, and in Figure (2) if $I_2 = 2I$. Find I_3 in terms of (I).



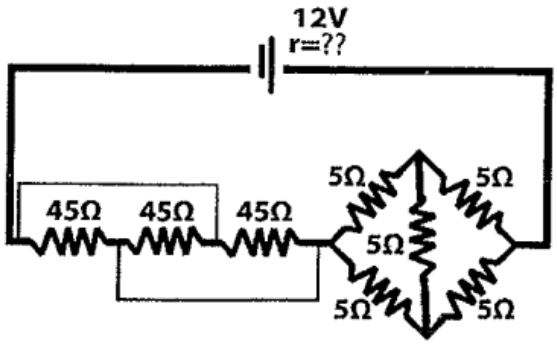
(A) 3I
(B) 4I
(C) 2I
(D) 6I

77) In the opposite electrical circuit. The reading of the ammeter is I_1 when the switch K is open and its reading is I_2 when the key is closed. Find the ratio (I_1/I_2).

(A) 3/2
(B) 2/3
(C) 4/9
(D) 9/4



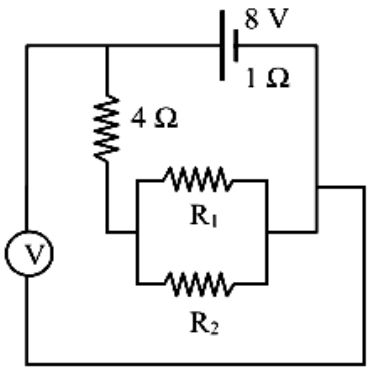
78) In the circuit shown in the figure, a battery with an emf of 12V and its efficiency is 80% connected to resistors as in the drawing, five resistors the value of each resistance is 5Ω, and another group at the two ends is 45Ω, and in the middle is 45Ω. The value of the internal resistance of the battery is…….. Ω



(A) 2
(B) 4
(C) 5
(D) 10

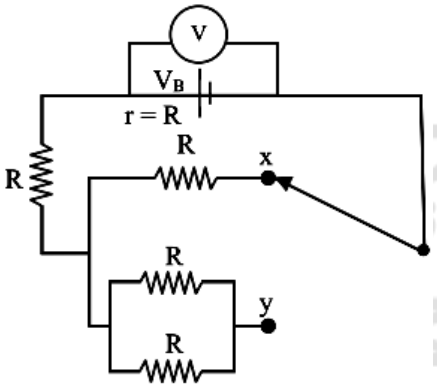
79) Shown in the opposite figure, if the voltmeter reading is 7V.

Find the value of $\frac{3(R_2 + R_1)}{R_1 R_2}$.



(A) 1/1
(B) 1/2
(C) 2/1
(D) 3/2

80) In the electrical circuit shown in the opposite figure, assuming that the voltmeter reading is equal to (10V), if a conversion is made Switch from point x to point y. find the voltmeter reading.



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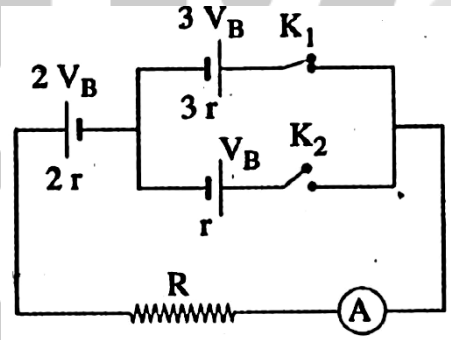
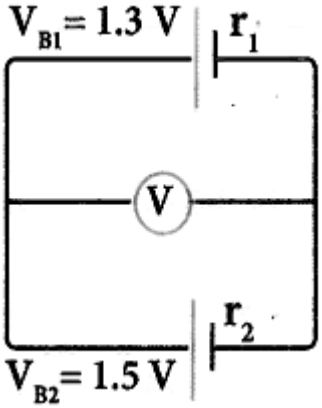
81) In the circuit shown when switch K_1 is opened and switch K_2 closed, which of the following options illustrates what happens for both the direction of the current through the resistor R and the reading of the ammeter?

	Direction of current	Ammeter reading
A	Remains the same	Increases
B	Reversed	Decreases
C	Remains the same	Decreases
D	Reversed	Increases



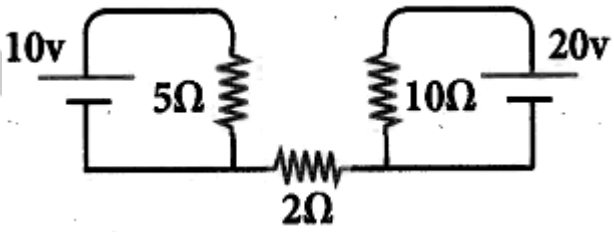
82) If the voltmeter reading is 1.45 volts (assuming the voltmeter is ideal). **Find** the value of r_1 (in terms of r_2).

(A) $3r_2$
(B) $4r_2$
(C) $1.3r_2$
(D) $1.5r_2$



83) From the opposite circuit. **Calculate** current intensity passing through 2Ω.

(A) zero
(B) 4A
(C) 3A
(D) 2A



84) From the opposite figure. Find the value of (I_5).

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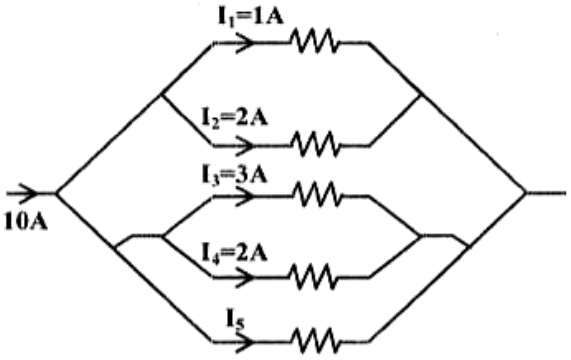
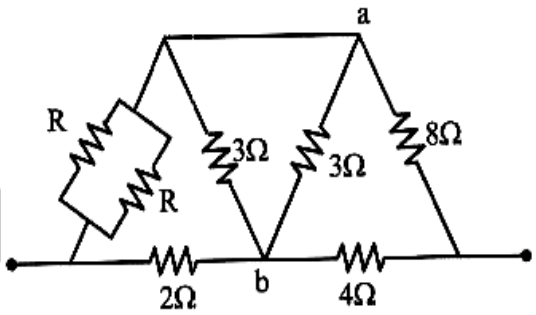
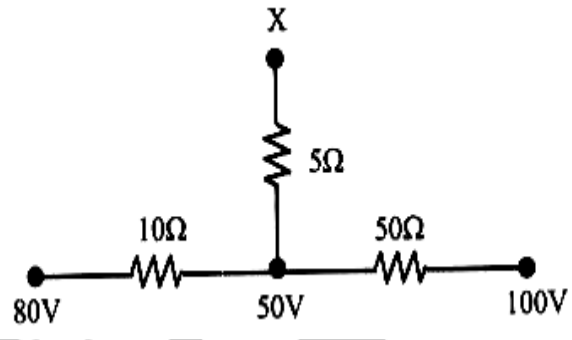


85) From the opposite figure. If V_a equals V_b. Find the value of (R).



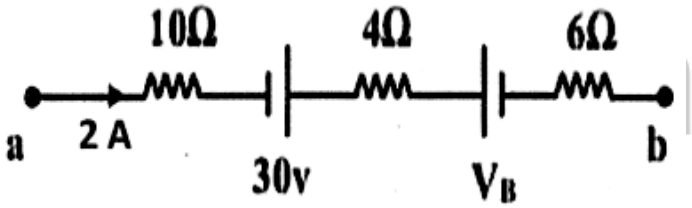
(A) 8Ω.
(B) 4Ω
(C) 3Ω
(D) 2Ω

86) From the opposite figure. Calculate value of potential difference at point (x).



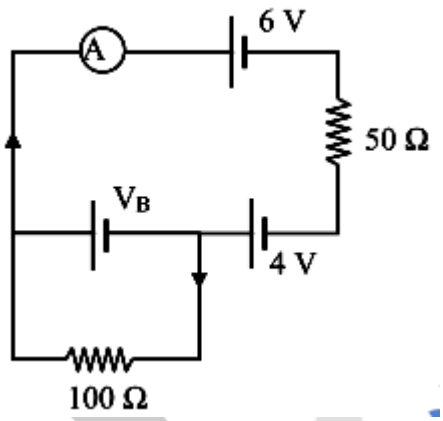
(A) 30V
(B) 40V
(C) 50V
(D) 20V

87) From the opposite figure, ab is a part of dc circuit. If energy consumed through 1 hour is E = 360kJ. **Calculate** (V_{ab}).



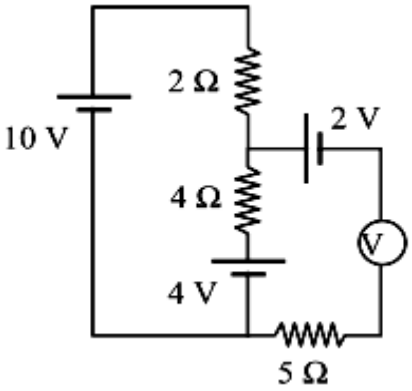
(A) 20V
(B) 40V
(C) 50V
(D) 30V

88) From the opposite figure, if reading of ammeter is 0.06A. **Find** V_B.



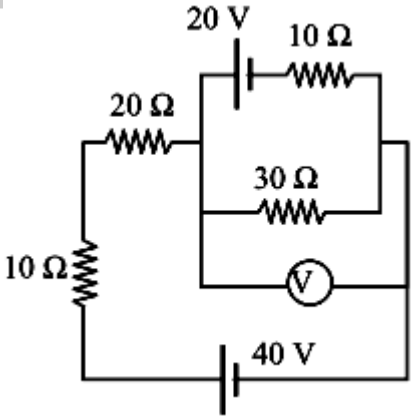
(A) 5/1V
(B) 1/5V
(C) 1/25V
(D) 25/1V

89) From the opposite figure. Determine reading of voltmeter (V). **(assuming The resistance of a voltmeter is infinite)**



(A) 2V
(B) 4V
(C) 8V
(D) 6V

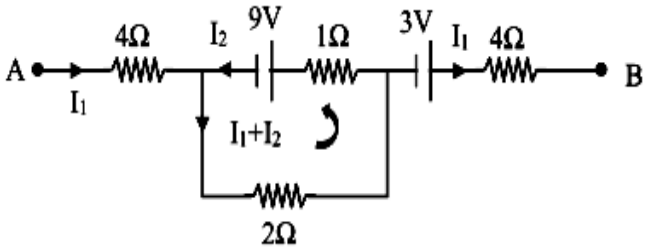
90) From the opposite figure. Determine reading of voltmeter (V).



(A) 20V
(B) 30V
(C) 10V
(D) 40V

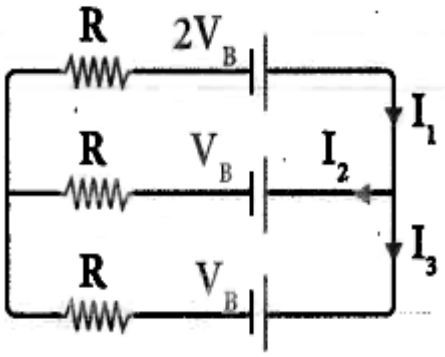
91) The opposite figure represents part of an electrical circuit. If the voltage difference between two points (A, B) $V_A - V_B = 16V$. Find the electric current passing through the resistor 2Ω.

(A) 4.5A
(B) 2.5A
(C) 4A
(D) 1.5A



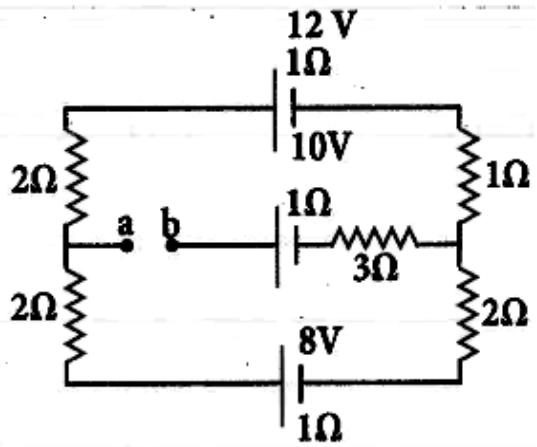
92) From the opposite figure. Determine the ratio (I_2/I_1).

(A) 1/2
(B) 1/3
(C) 1/4
(D) 1/8

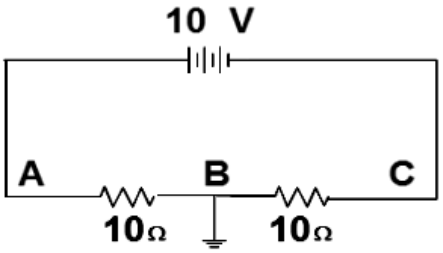


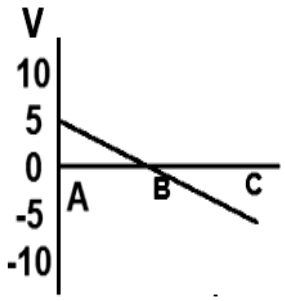
93) From the opposite figure. Calculate value of (V_{ab}).

(A) 2/9V
(B) 9/2V
(C) 4/3V
(D) 3/2 V

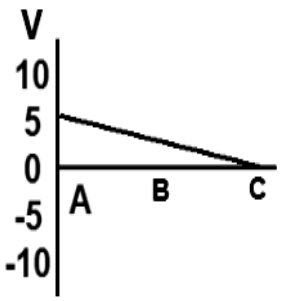


94) Which of the following graphs represents correctly about change in potential difference across the points showing in the circuit?

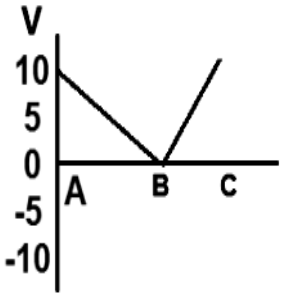




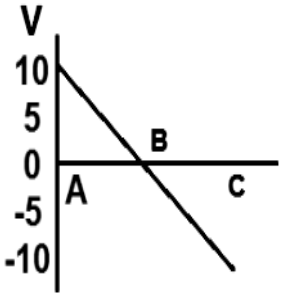
(A)



(B)

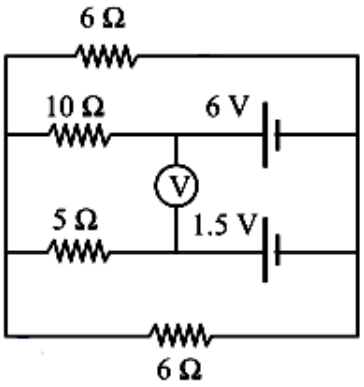


(C)



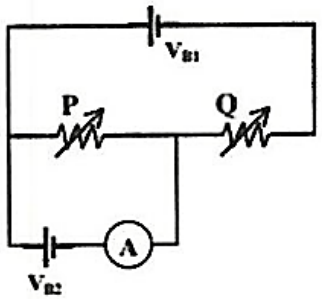
(D)

95) From the opposite figure. Determine reading of voltmeter (V).



(A) 4.5V
(B) 1.5V
(C) 6V
(D) 5V

96) Two batteries (V_{B2}, V_{B1}) and their internal resistances are neglected. They were connected to two resistances (P, Q) as in the figure. if the ammeter does **not** deviate from its equilibrium position, then the ratio $\frac{VB1}{VB2}$ =….



A. $\frac{P}{Q}$

B. $\frac{P}{P+Q}$

C. $\frac{Q}{P+Q}$

D. $\frac{P+Q}{P}$