(a) 1:2 (b) 2:1 (c) 1:4 (d) 4:1

5. How is a voltmeter connected in the circuit to measure the potent two points?

6. A copper wire has diameter 0.5 mm and resistivity of 1.6×10 the length of this wire to make its resistance 10 Ω? How much change if the diameter is doubled?

7. The values of current I flowing in a given resistor for the cor potential difference V across the resistor are given below –

I (amperes)	0.5	1.0	2.0	3.0	4.0
V (volts)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance o

8. When a 12 V battery is connected across an unknown resist of 2.5 mA in the circuit. Find the value of the resistance of t

9. A battery of 9 V is connected in series with resistors of 0.2 Ω and 12 Ω, respectively. How much current would flow throug

10. How many 176 Ω resistors (in parallel) are required to carry

11. Show how you would connect three resistors, each of resista combination has a resistance of (i) 9 Ω (ii) 4 Ω

12. Several electric bulbs designed to be used on a 220 V elec rated 10 W. How many lamps can be connected in parallel wi the two wires of 220 V line if the maximum allowable curren

13. A hot plate of an electric oven connected to a 220 V line has A and B, each of 24 Ω resistance, which may be used separa parallel. What are the currents in the three cases?

14. Compare the power used in the 2 Ω resistor in each of th (i) a 6 V battery in series with 1 Ω and 2 Ω resistors, and (ii) a 4 with 12 Ω and 2 Ω resistors.

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$\rho = 1.6 \times 10^{-8}\ \Omega\text{-m}$

$R = 10\ \Omega \quad l = ?$

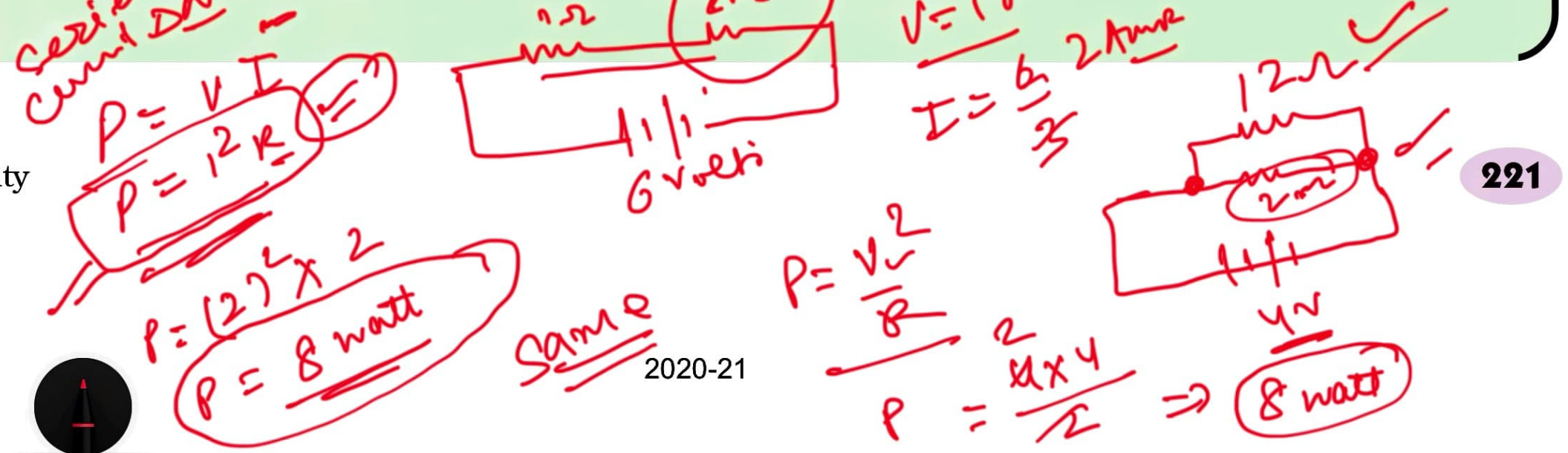
$R = \rho \frac{l}{A}$

$l = \frac{R \times A}{\rho}$

$A = \pi r^2$

$l = \frac{10 \times 3.14 \times (0.25 \times 10^{-3})^2}{}$

9. How many 176 Ω resistors (in parallel) are required to carry 5 A on a 220 V line?
10. Show how you would connect three resistors, each of resistance 6 Ω, so that the combination has a resistance of (i) 9 Ω, (ii) 4 Ω.
11. Several electric bulbs designed to be used on a 220 V electric supply line, are rated 10 W. How many lamps can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 A?
12. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B, each of 24 Ω resistance, which may be used separately, in series, or in parallel. What are the currents in the three cases?
13. Compare the power used in the 2 Ω resistor in each of the following circuits: (i) a 6 V battery in series with 1 Ω and 2 Ω resistors, and (ii) a 4 V battery in parallel with 12 Ω and 2 Ω resistors.



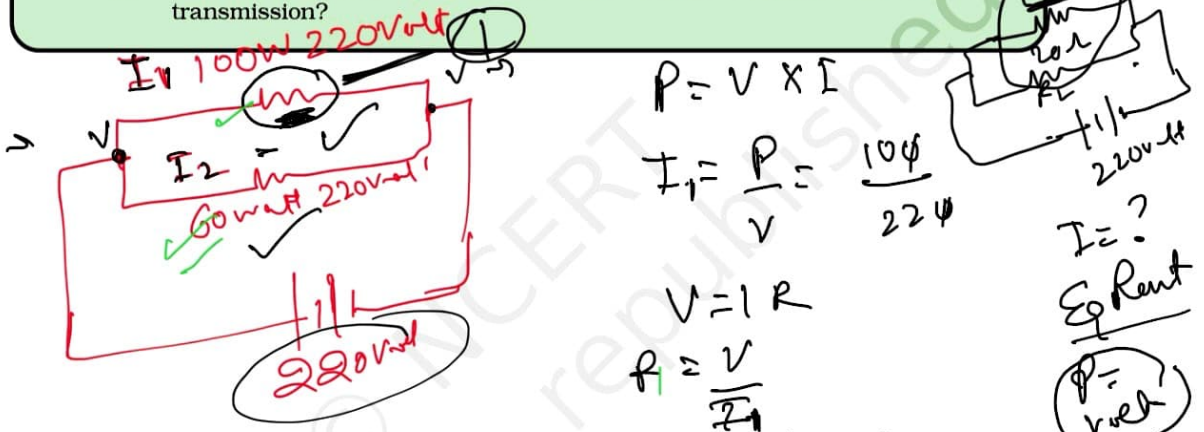
(a) Why is the tungsten used almost exclusively for filament of electric lamps?

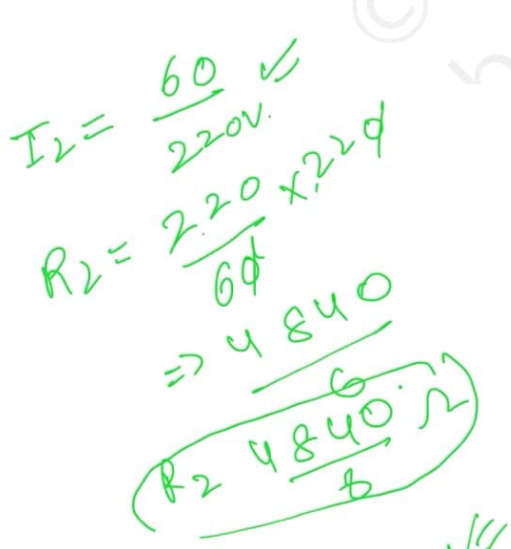
(b) Why are the conductors of electric heating devices, such as bread-toasters and electric irons, made of an alloy rather than a pure metal?

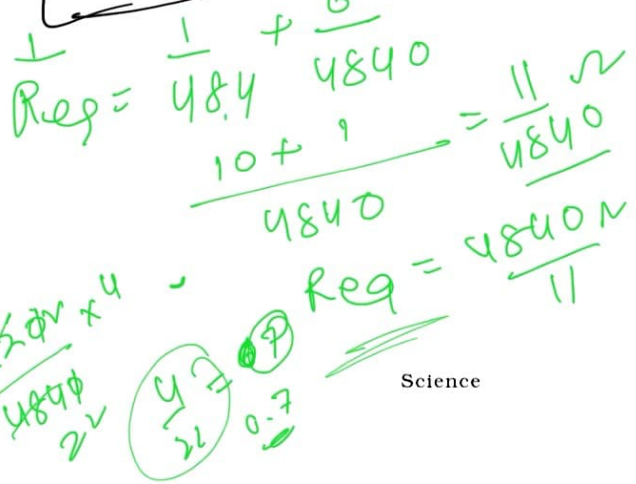
(c) Why is the series arrangement not used for domestic circuits?

(d) How does the resistance of a wire vary with its area of cross-section?

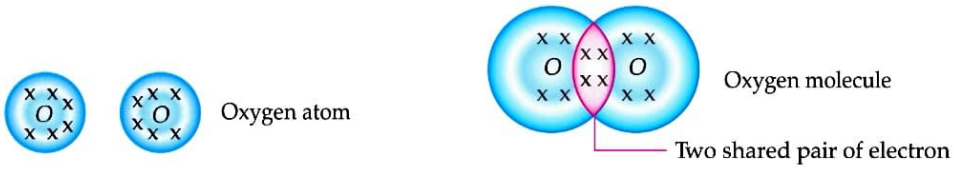
(e) Why are copper and aluminium wires usually employed for electricity transmission?





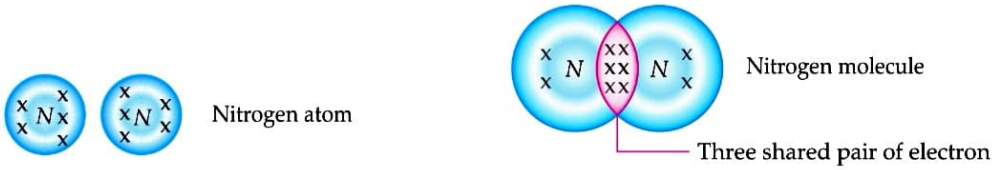


(ii) O_2



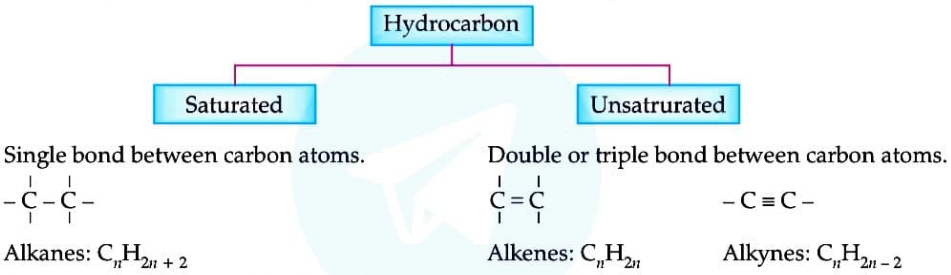
O = O: Double bond between oxygen atoms

(iii) N_2



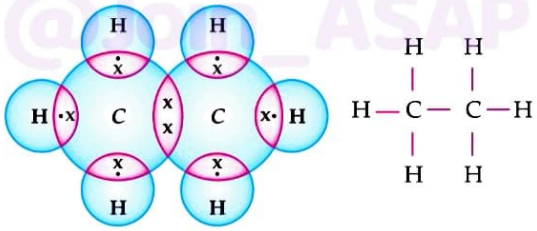
N ≡ N: Triple bond between nitrogen atoms

- **Hydrocarbon:** Compounds made up of hydrogen and carbon are called hydrocarbon.



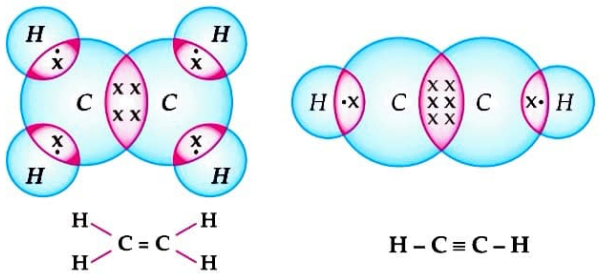
- **Electron dot structure of saturated hydrocarbons:**

Ethane C_2H_6



- **Electron dot structure of unsaturated hydrocarbons:**

Ethene: C_2H_4 Ethyne: C_2H_2



H – C ≡ C – H

- **Cyclic or Closed Chain Hydrocarbons:** These are the hydrocarbons which have carbon - carbon closed chain. They are classified as:
  - **(i) Alicyclic hydrocarbons:** These are the hydrocarbons which do not have benzene ring in their structures.
  - **(ii) Aromatic hydrocarbons:** The hydrocarbons which have benzene ring in their structures. When hydrogen bonded to carbon of benzene is substituted with halogens, radicals or other functional groups, the derivatives are called aromatic compounds.

(ii) **Solubility:** They are generally insoluble in water and other polar solvents but soluble in organic solvents such as benzene, toluene etc.

(iii) **Melting and boiling points:** They generally have low melting and boiling points.

(iv) **Electrical conductivity:** They do not conduct is more apt word instead of electrical current.

Steps for writing the Lewis dot Structures of a covalent compound:

(i) Write the electronic configuration of all the atoms present in the molecule.

(ii) Identify how many electrons are needed by each atom to attain noble gas configuration.

(iii) Share the electrons between atoms in such a way that all the atoms in a molecule have noble gas configuration.

(iv) Keep in mind that the shared electrons are counted in the valence shell of both the atoms sharing it.

Scan to know more about this topic

Covalent bond

➤ **Examples: (i)** H_2

H – H: Single bond between hydrogen atoms

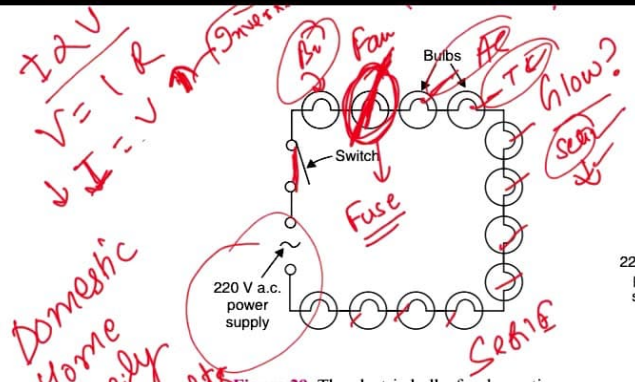


Figure 29. The electric bulbs for decoration are usually connected in series circuit with the 220 volt a.c. (alternating current) power supply line (The circuit symbol for alternating current or a.c. supply is —o ≀ o—). Please note that all the bulbs have just one switch.

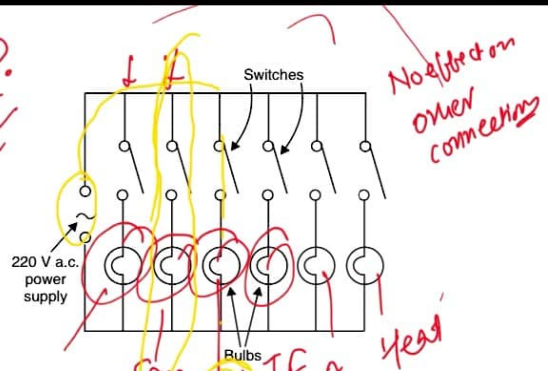


Figure 30. The electric bulbs in a house are connected in parallel circuit with the 220 volt a.c. power supply line. Please note that all the bulbs have separate switches (Just like bulbs, all other appliances like fan, TV, fridge, electric iron, etc., are also connected in parallel in a similar way).

The parallel electric circuit is *better* for connecting bulbs (and other electrical appliances) in a house because then we can have separate switches for each bulb (or electrical appliance) and hence operate it separately (see Figure 30). In addition to having ease of operation, parallel domestic circuits (or household circuits) have many other advantages over the series circuits. We will first give the disadvantages of the series electric circuits for domestic purposes and then the advantages of the parallel electric circuits.

Disadvantages of Series Circuits for Domestic Wiring

The arrangement of lights and various other electrical appliances in series circuit is not used in domestic wiring because of the following disadvantages :

1. In series circuit, if one electrical appliance stops working due to some defect, then all other appliances also stop working (because the whole circuit is broken). For example, if a number of bulbs are connected in series and just one bulb gets fused (or blows off), then all other bulbs will also stop glowing.

2. In series circuit, all the electrical appliances have only one switch due to which they cannot be turned on or off separately. For example, all the bulbs connected in series have only one switch due to which all the bulbs can be switched on or switched off together and not separately.

Figure 31. Christmas tree bulbs are usually wired in series.

3. In series circuit, the appliances do not get the same voltage (220 V) as that of the power supply line because the voltage is shared by all the appliances. The appliances get less voltage and hence do not work properly. For example, all the bulbs connected in series do not get the same voltage of 220 volts of the power supply line. They get less voltage and hence glow less brightly.

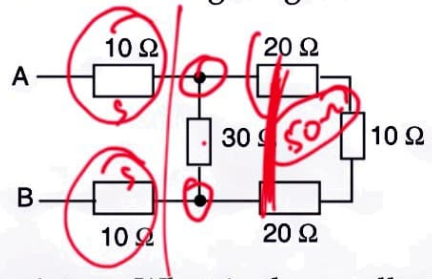
4. In the series connection of electrical appliances, the overall resistance of the circuit increases too much due to which the current from the power supply is low. Moreover, the same current flows throughout a series circuit due to which all the appliances of different power ratings cannot draw sufficient current for their proper working.

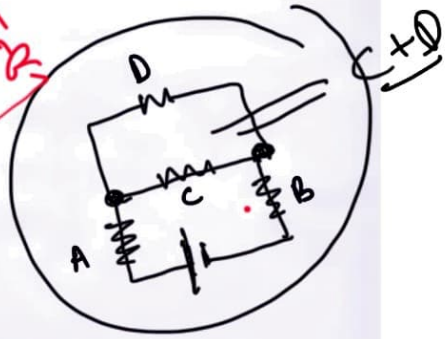
and (*b*) 1 Ω ?

49. What is (*a*) highest, and (*b*) lowest, resistance which can be obtained by combining four resistors having the following resistances ?

4 Ω, 8 Ω, 12 Ω, 24 Ω

50. What is the resistance between A and B in the figure given below ?

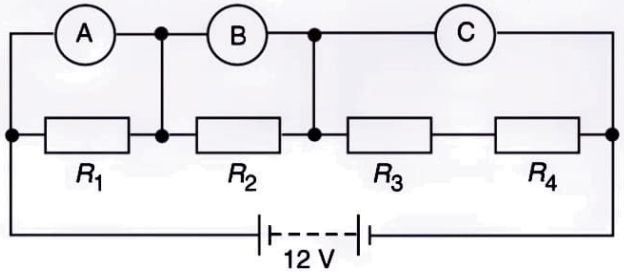




51. You are given one hundred 1 Ω resistors. What is the smallest and largest resistance you can make in a circuit using these ?

52. You are supplied with a number of 100 Ω resistors. How could you combine some of these resistors to make a 250 Ω resistor ?

53. The resistors R_1, R_2, R_3 and R_4 in the figure given below are all equal in value.



What would you expect the voltmeters A, B and C to read assuming that the connecting wires in the circuit have negligible resistance ?

54. Four resistances of 16 ohms each are connected in parallel. Four such combinations are connected in series. What is the total resistance ?

55. If th... A_4 and A_5 re...

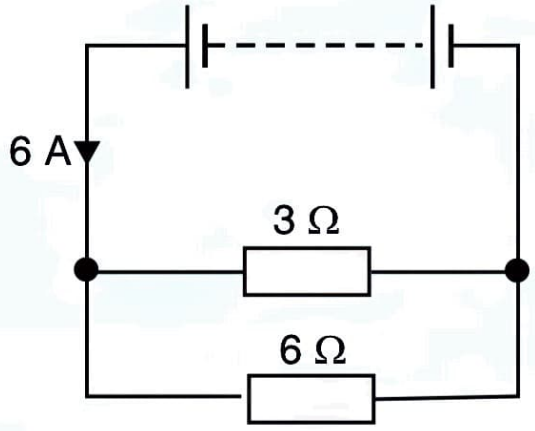
(*a*) What is the combined resistance ?

(*b*) What current flows ?

(*c*) What is the p.d. across 2 Ω resistor ?

(*d*) What is the p.d. across 3 Ω resistor ?

In the circuit given below :



(*a*) What is the combined resistance ?

(*b*) What is the p.d. across the combined resistance ?

(*c*) What is the p.d. across the 3 Ω resistor ?

(*d*) What is the current in the 3 Ω resistor ?

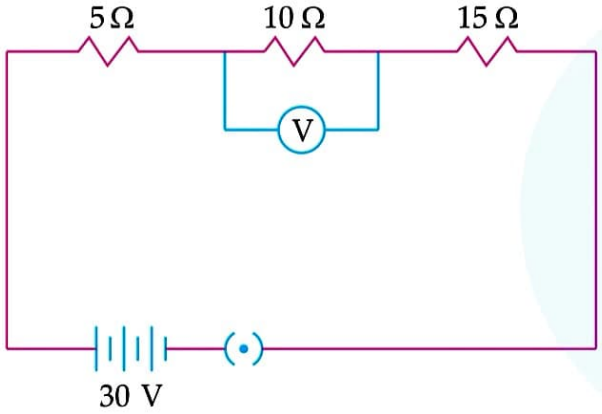
(*e*) What is the current in the 6 Ω resistor ?

Q. 1. Read the passage and answer any four questions from (a) to (e).

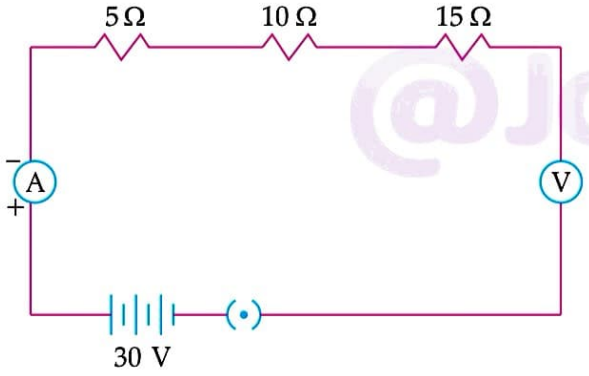
Three resistors of 5 Ω, 10 Ω and 15 Ω are connected in series and the combination is connected to the battery of 30 V. Ammeter and voltmeter are connected in the circuit.

(a) Which of the following is the correct circuit diagram to connect all the devices in proper correct order. A

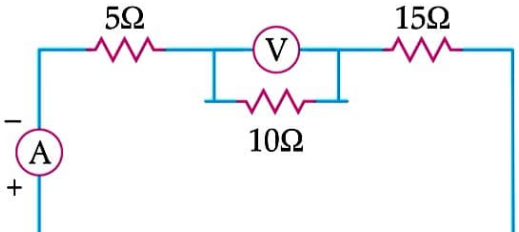
(i)



(ii)

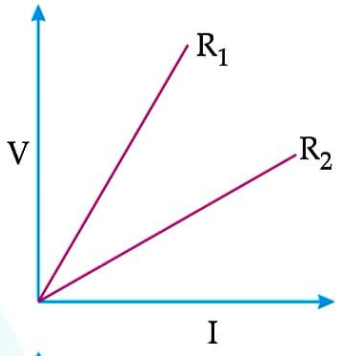


(iii)

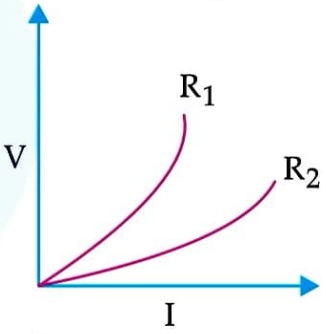


(c) Two students perform experiments on two given resistors R_1 and R_2 and plot the following V-I graphs. If $R_1 > R_2$, which of the diagrams correctly represent the situation on the plotted curves? U

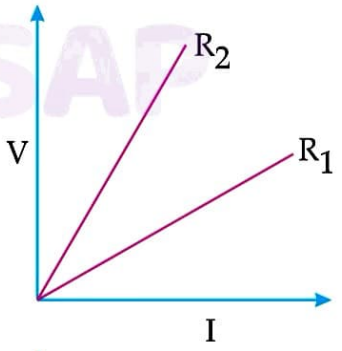
(i)



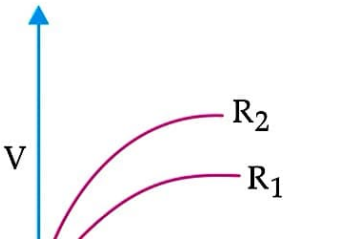
(ii)



(iii)

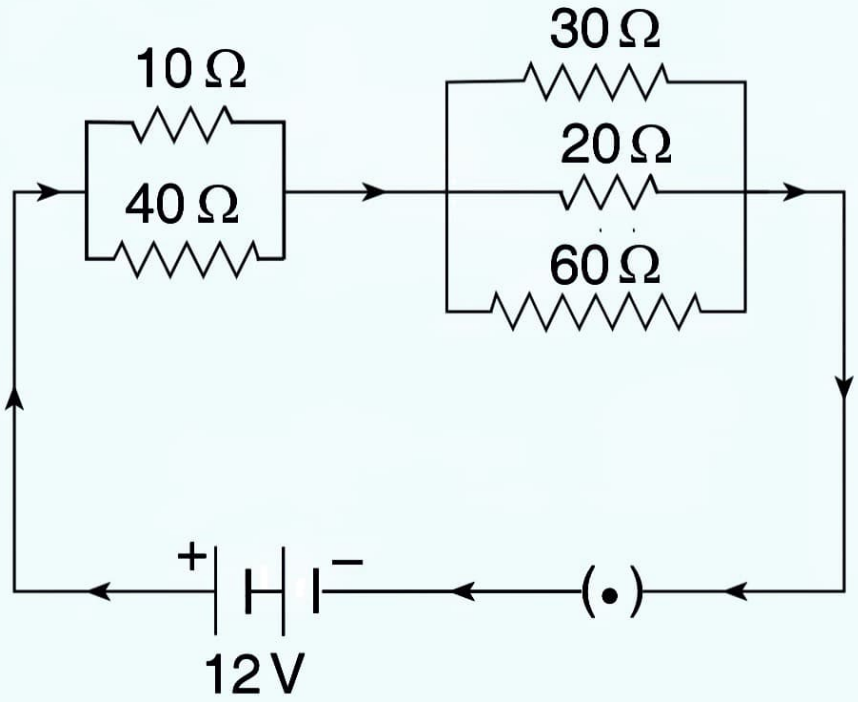


(iv)



d B are used in parallel.

diagram given below five resistances of 10 Ω, 40 Ω, 30 Ω, 20 Ω and 60
2 V battery.



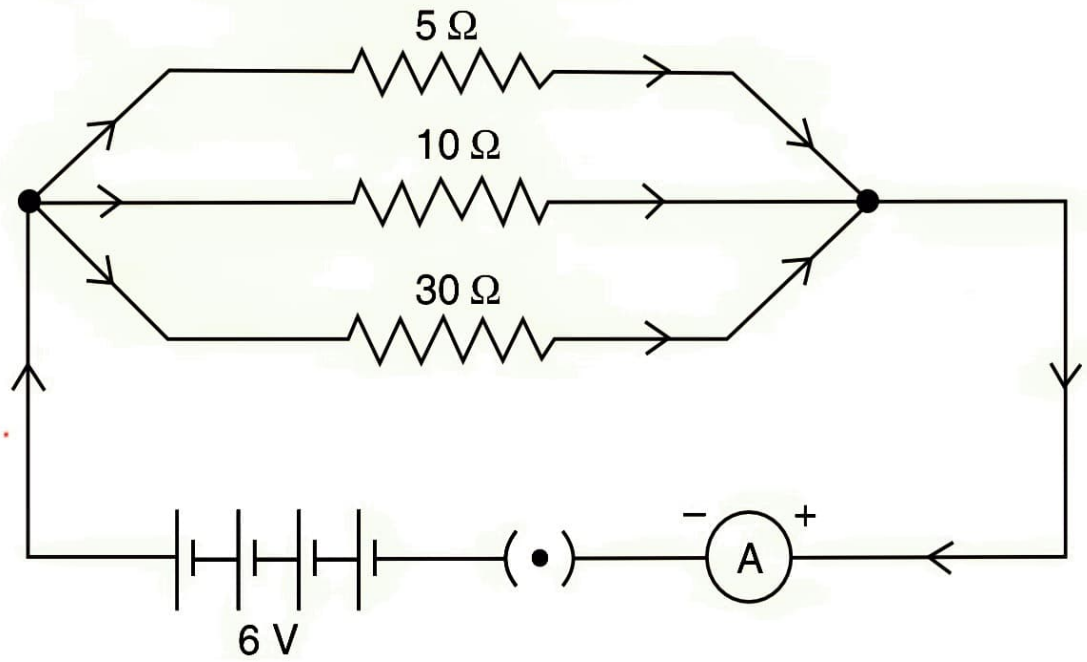
ance in the circuit.

s the value of R ?

s the value of V ?

he help of a diagram, derive the formula for the resultant resistance of three resistors connected in

e circuit shown in the diagram given below :



(*i*) 6 Ω (*ii*) $\frac{6}{11}$ Ω (*iii*) 1.5 Ω

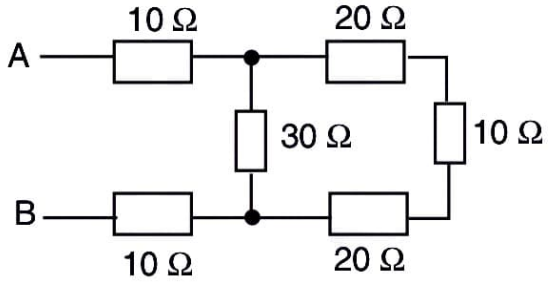
47. How will you connect three resistors of 2 Ω, 3 Ω and 5 Ω respectively so as to obtain a resultant resista 2.5 Ω ? Draw the diagram to show the arrangement.

48. How will you connect three resistors of resistances 2 Ω, 3 Ω and 6 Ω to obtain a total resistance of : (*a* and (*b*) 1 Ω ?

49. What is (*a*) highest, and (*b*) lowest, resistance which can be obtained by combining four resistors havi following resistances ?

4 Ω, 8 Ω, 12 Ω, 24 Ω

50. What is the resistance between A and B in the figure given below ?



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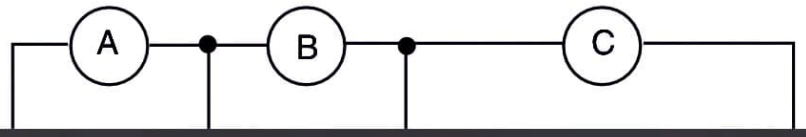
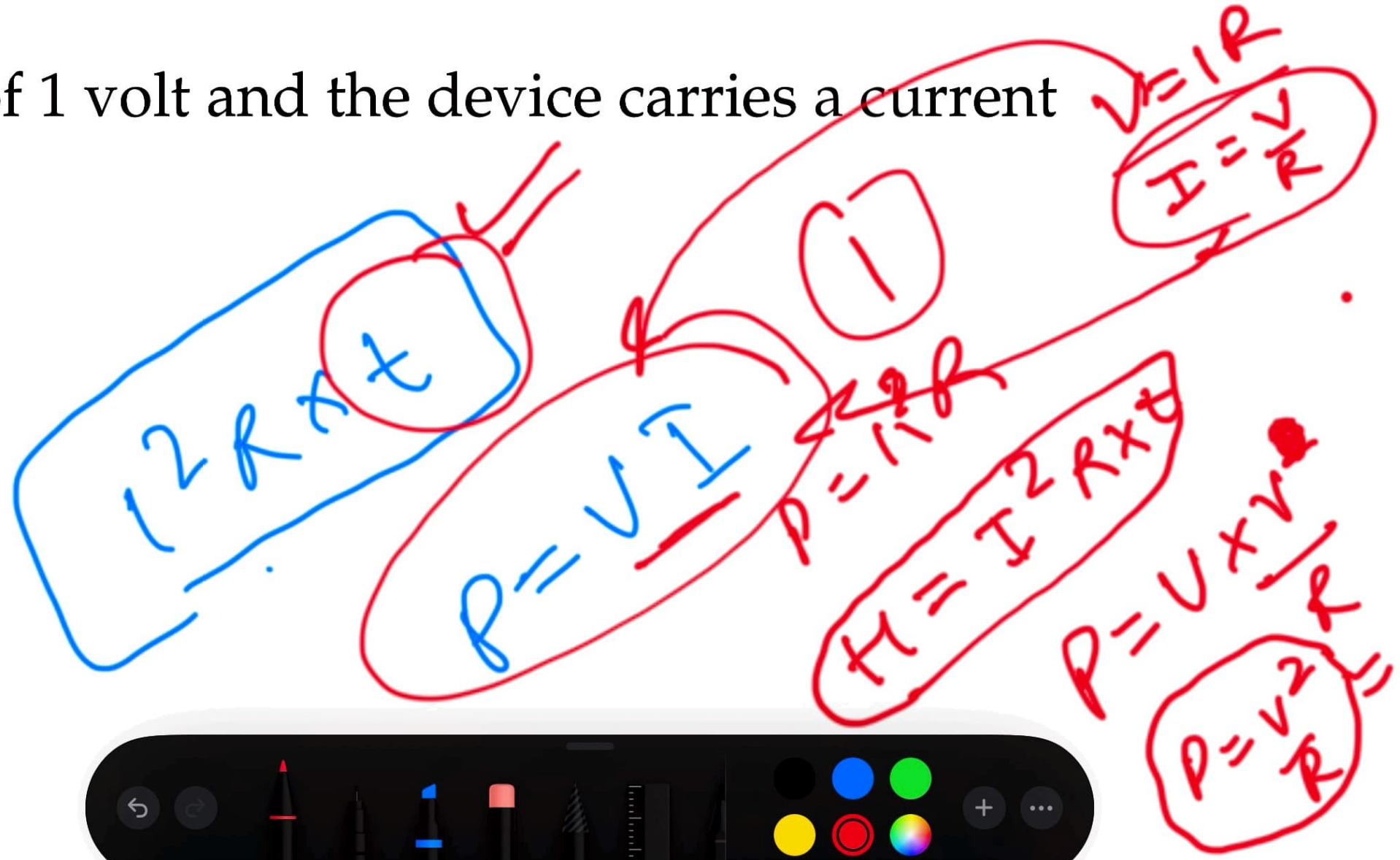
53. The resistors R_1, R_2, R_3 and R_4 in the figure given below are all equal in value.



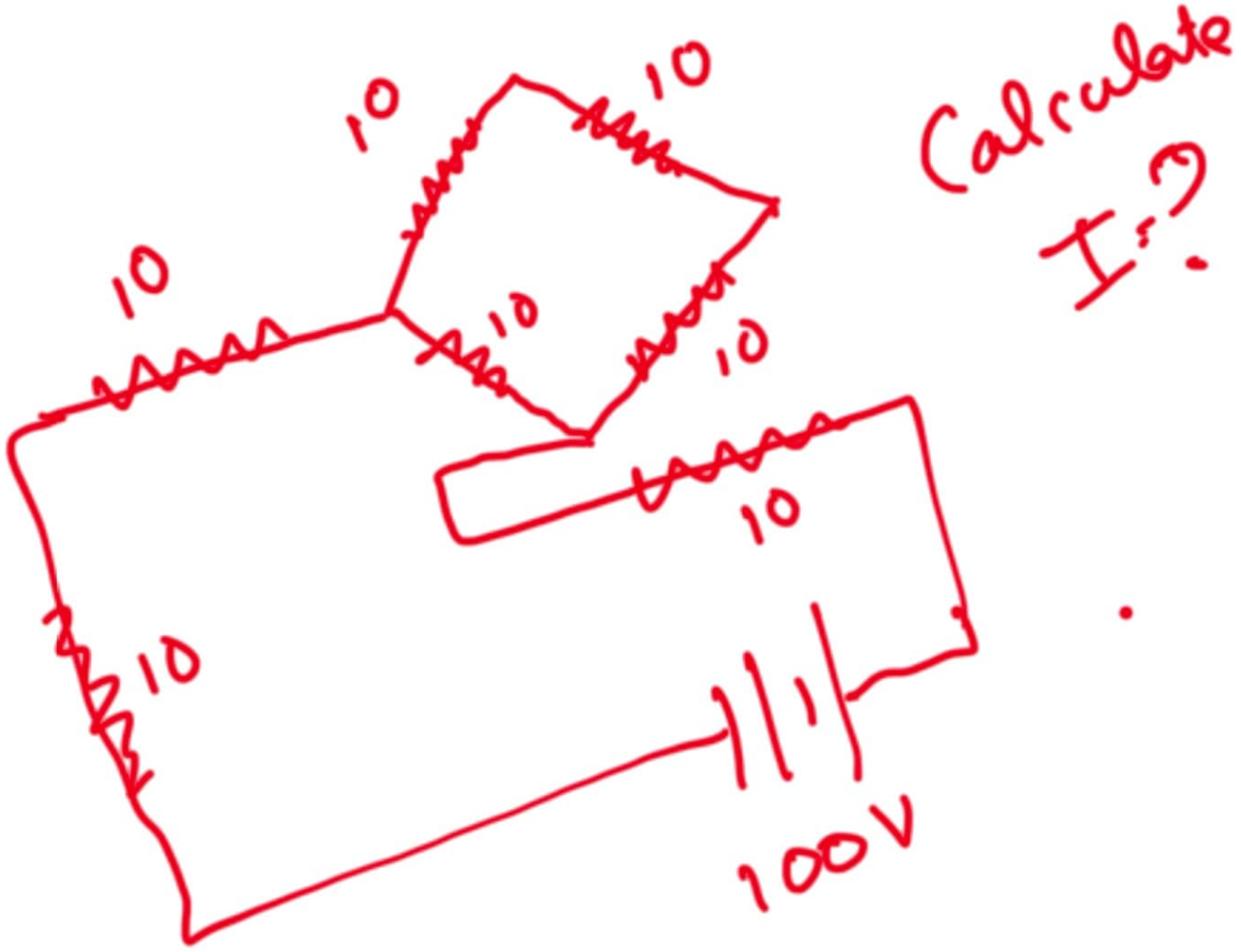
ference of 1 volt and the device carries a current

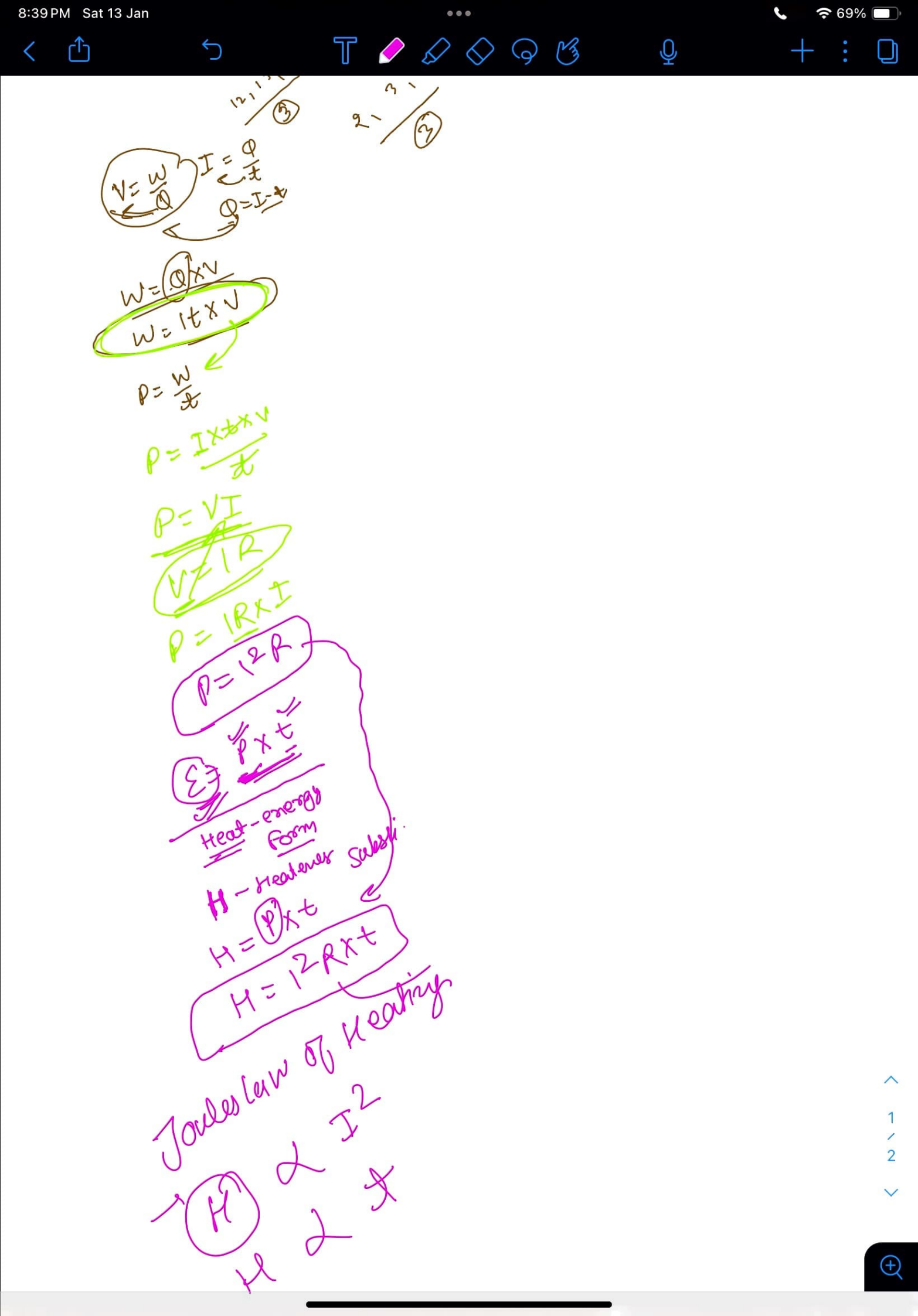


ent can be calculated by using Ohm's law equation :

(To be calculated)

get :




V = W/Q
I = Q/t
Q = I × t
W = Q × V
W = It × V
P = W/t
P = I × t × V / t
P = VI
V = IR
P = IR × I
P = I²R
E
P × t
Heat energy form
H - Heat energy Suksh
H = P × t
H = I²R × t
Joules law of Heating
H ∝ I²
H ∝ t