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P2 = 417 mW, P4 = 193 mW, P6 = 166 mWB. P2 = 407 mW, P4 = 183 mW, P6 = 156 mWC. P2 = 397 mW, P4 = 173 mW, P6 = 146 mWD. P2 = 387 mW, P4 = 163 mW, P6 = 136 mW Answer: Option A Explanation: There is no description of the answer available for this question. Let's talk. View Answer Discuss in Forum Workspace Report Page 2 Exercise:: Series-Parallel Circuits - General Questions View Answer Discuss in Forum Workspace Report View Answer Discuss in Forum Workspace Report Page 3 Exercise:: Series-Parallel Circuits - General Questions 11. What is the total strength of the given circuit? A. 92 B. 288 C. 17.7 D. 128 Answer: Option A Explanation: There is no description of the answer available for this question. Let's talk. View Answer Discuss in Forum Workspace Report View Answer Discuss in Forum Workspace Report Page 4 Exercise:: Series-Parallel Circuits - General Questions View Discuss in the Workspace Forum Report 17. If the load in the given circuit is 12 k, what is the output voltage charged? A. 5.88 VB. 14.12 CV. 16 VD. 17.14 V Answer: Option B Explanation: No response available for this question. Let's talk. View Answer Discuss in Forum Workspace Report Page 5 Exercise:: Series-Parallel Circuits - General Questions 21. What circuit defect indicates the meter readings in the given figure? A. The 1 k resistor is open.B. The 4.7 k resistor is open.C. The 2.2 k resistor is open.D. The 3.3 k resistor is open. Answer: Option B Explanation: No answer description available for this question. Let's talk. See Answer Discuss in Forum Workspace Report 22. How much current flows through R1 in the given circuit? A. 0.3 AB. 0.15 AC. 0.5 AD. 0.68 An answer: Option C Explanation: No answer description available for this question. Let's talk. View Answer Discuss in Forum Workspace Report Page 6 Exercise:: Series-Parallel Circuits - General Questions View Answer Discuss in Forum Workspace Report View Answer Discuss in Forum Workspace Report Page 7 Exercise:: Series-Parallel Circuits - General Questions 31. What circuit defect indicates the meter readings in the given figure? A. The 1 k resistor is short-circuited.B. The 4.7 k resistor is short-circuited.C. The 2.2 k resistor is short-circuited.D. The 3.3 k resistor is short-circuited. Answer: Option D Explanation: No answer description available for this question. Let's talk. View Answer Discuss in Forum Workspace Report View Answer Discuss in Forum Workspace Report To continue to enjoy our website, please confirm your identity as a human. Thank you very much for your cooperation. Determine the following quantities for each of the two circuits indicated below... Equivalent resistance of the current from the current power supply through each resistor decreases the voltage over each resistor the power dissipated in each resistor Follow the rules for the series circuits. The resistances in the series are piling up. RT = R1 + R2 + R3 RT = 20 Ω + 30 Ω + 50 Ω RT = 100 Ω The total current is determined by the voltage of the power supply and the equivalent strength of the circuit. IT = VT/RTIT = 125 V/100 ρIT = 1.25 A The current is constant through serial resistors. IT = I1 = I2 = I3 = 1.25 A Voltage drops can be found using Ohm's law. V1 = I1R1V1 = (1.25 A)(20 Ω)V1 = 25.0 V V2 = I2R2V2 = (1.25 A)(30 Ω Ω <1> <2>)V2 = 37.5 V V3 = I3R3V3 = (1.25 A)(50 Ω)V3 = 62.5 V Check calculations by adding voltage drops. On a serial circuit they should equal the increase in the voltage of the power supply. VT = V1 + V2 + V3 125 V = 25.0 V + 37.5 V + 62.5 V 125 V = 125 V We're fine, so let's finish. There are three equations for determining power. Since we have three resistors, let's apply a different equation to each as an exercise. P1 = V1 I1P1 = (25.0 V)(1.25 A)P1 = 31,250 W P2 = I22R2P2 = (1.25 A)2(30 Ω)P2 = 46.875 W P3 = V32/R3P3 = (62.5 V)2/(50 Ω)P3 = 78.125 W In a serial circuit, the item with the highest consumes the greatest power. Follow the rules of parallel circuits. Parallel resistances shall be combined in accordance with the reverse sum rule. 1 = 1 + 1 + 1 RT R1 R2 R3 1 = 1 + 1 + 1 RT 20 Ω 100 Ω 50 Ω Ω = 5 + 1 + 2 RT 100 Ω 100 Ω 100 Ω 1 = 8 RT 100 Ω RT = 100 Ω = 12.5 Ω 8 The total current is determined by the voltage of the power supply and the equivalent resistance of the circuit. IT = VT/RTIT = 125 V/12.5 ρIT = 10 A (Note: we will respond to part IV before Part III.) On a parallel circuit, each branch experiences the same voltage drop. VT = V1 = V2 = V3 = 125 V The current in each branch can be found using Ohm's law. I1 = V1/R1I1 = (125 V)/(20 Ω)I1 = 6.25 A I2 = V2/R2I2 = (125 V)/(100 Ω)I2 = 1.25 A I3 = V3/R3I3 = (125 V)/(50 Ω)I3 = 2.50 Check calculations by adding currents. On a parallel circuit they should be added up to the current from the power supply. IT = I1 + I2 + I3 10 A = 6.25 A + 1.25 A + 2.50 A 10 A = 10 A Good, works. Again, as an exercise, use a different equation to determine the electrical power of each resistor. P1 = V1I1P1 = (125 V)(6.25 A)P1 = 781.25 W P2 = I22R2P2 = (1.25 A)2(100 Ω)P 2 = 1 56.25 W P3 = V32/R3P3 = (125 V)2/(50 Ω)P3 = 312.50 W In a parallel circuit, the element with the lowest strength consumes the highest power. A North American kitchen has three appliances connected to a 120 V circuit with a 15 A circuit breaker: an 850W coffee maker, a 1200W microwave, and a 900W toaster. Which of these devices can be operated simultaneously without preventing the circuit breaker? The sockets are connected in parallel so that the devices on a circuit are independent of each other. Turning off the coffee machine will not stop the toaster (assuming both were switched on at the same time). Each device will also receive the same regulated voltage, which simplifies the design of electrical devices. The disadvantage of this scheme is that parallel currents can be added to dangerously high levels. A serial circuit breaker before parallel branches can prevent overloads by automatically opening the circuit. A 15 A circuit operating at 120 V consumes 1,800 W of total power. P = VI = (120 V)(15 A) = 1,800 W The total power in a parallel circuit is the sum of the power consumed on individual branches. coffee maker + microwave 850 W + 1200 W 2050 W microwave + toaster 1200 W + 900 W 2100 W toaster + coffee maker 900 W + 850 W 1750 W On this circuit, only coffee maker and toaster can be operated simultaneously. All other combinations will trigger the opening of the circuit breaker. The diagram below shows a circuit with a battery and 10 resistors; 5 on the left and 5 on the right. Determine... current by lowering the voltage over the power dissipated by each resistor The way to solve a complex problem is to break it down into a series of simpler problems. Be careful not to lose sight of your objective among all bits and pieces, however. to start the course plot. In this case, we will start by finding the effective resistance of the entire circuit and the current from the battery. This sets us to get current in all different segments of the circuit. (In (In divide and divide again in an effort to follow the most resistance path.) After that, it is a simple matter to calculate the voltage drops in each resistor using V = IR and dissipated power using P = VI. No part of this problem is difficult by itself, but since the circuit is so complex we will be quite busy for a while. Let's start the process by combining the resistors. There are four serial pairs in this circuit. Rs left = 3 Ω + 1 ρRs = 4 ρRs = 4 Ω + 2 ρRs = 6 Ω r - right Rs = 2 Ω + 3 ρRs = 1 Ω + 4 ρRs = 5 Ω These pairs form two parallel circuits, one to the left and one to the right. Left right Each band of four resistors is in series with another. Rs left = 2.4 Ω + 0.6 ρRs = 3 Ω r right = 2.5 Ω + 0.5 ρRs = 3 Ω The left and right halves of the circuit are parallel to each other and with the battery. 1 = 1 + 1 = 2 Rp 3 Ω 3 Ω 3 Ω Now that we have the actual strength of the entire circuit, let's determine the current from the power supply using Ohm's law. Itotal = Vtotal + 24 V = 16 A Rtotal 1.5 Ω Now walk through the circuit (not literally, of course). At each junction the current will be divided by more taking the path with less resistance and less taking the path with more resistance. Because the charge does not leak anywhere on a complete circuit, the current will be the same for all these items in series with one another. The left and right halves of the circuit are identical in the overall strength, which means that the current will split evenly between them. 8 A for 0.6 resistor on the left. 8 A for 0,5 presistor on the right. On each side the current is divided again into two parallel branches. The branches on the left have resistance scars in the ratio... R1&3 = 4 Ω + 2 R2&4 6 Ω 3 which means that the currents will be divided in the ratio... for 1 Ω and 3 presistors on the left. for the 2 Ω and 4 presistors on the left. The branches on the right are identical, so the current is divided into two equal halves. ☟☟☟☟☟ for the 2 Ω and 3 -resistors on the right. for 1 Ω and 4 presistors on the right. Use V = IR over and over and over again to determine voltage drops. (See the tables at the end of this solution.) Use P = VI (or P = I2R or P = V2/R) in over and over mode again to determine the dissipated power. These last two tasks are so boring you should use a spreadsheet application of some kind. Enter the data strength values and current values only calculated in columns and instruct the electronic device of choice to multiply properly. Something like that... Left side resistance (Ω) current(A) voltage(V) power(W) 0.6 8.0 04.8 38.40 1.0 4.8 04.8 8 23.04 2.0 3.2 06.4 20.48 3.0 4.8 14.4 69.1 2 3.0 4.8 14.4 69.12 2 4.0 3.2 12.8 40.96 Resistance on the right side (Ω) current(A) voltage(V) power(W) 0.5 8 04 32 0 1.0 4 04 16 2.0 4 08 32 3.0 12 48 4.0 4 16 64 Given the circuit below... Calculate the equivalent strength of the circuit. Calculate the current through the battery. The voltage of the graph depending on the location of the circuit assuming thatVa = 0 V at battery terminal. Current graph as a location function on the routing. Here are the solutions... Total resistance in a serial circuit is the sum of individual resistances... RT = R1 + R2 + R3RT = 3 Ω + 9 Ω + 6 ρRT = 18 Ω The total current can be found from Ohm's law... IT = VT/RTIT = (12 V)/(18 Ω) = 2/3 AIT = 0.667 A The voltage in a circuit increases in a battery and decreases in a resistor (when we follow the conventional current flow). The increase in battery is given as 12 V and drops in each resistor can be found by repeated use of Ohm's law... V1 = I1R1V1 = (2/3 A)(3 Ω)V1 = 2 V V2 = I2R2V2 = (2/3 A)(9 Ω)V2 = 26 V V3 = I3R3V3 = (2/3 A)(6 Ω)V3 = 4 V Starting from zero volts on the negative battery terminal, the voltage goes up by 12 V, then it drops 2 V, 6 V, and 4 V, which brings us back to zero. (We assume that the battery and wires have negligible strength.) Here's the show when you graph. Here's what the chart is on the circuit. The current is everywhere the same in a serial circuit. We've already established that it's 0.667 A. All that remains is to draw a horizontal line to two-thirds of an amplifier. Here's what the chart is on the circuit. Circuit.