Suggested problems: Chapter 27- HRW-Principles of Physics- ISV 10th Edition. .

2. In Fig. 27-18, the ideal batteries have emfs ε_1=12.0 V and $\varepsilon_2 = 0.500\varepsilon_1$, and the resistances are each 4.00 Ω.What is the current in (a) resistance 2 and (b) resistance 3?

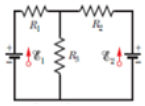

Fig. 27-18

Answer: : (a) $i_2 = 0.0$ A ; (b) $i_3 = 1.5$ A.

19. In Fig. 27-30, the current in resistance 6 is $i_6 = 2.80$ A and the resistances are $R_1 = R_2 = R_3 = 2.00$ Ω, $R_4 = 16.0$ Ω, $R_5 = 8.00$ Ω, and $R_6 = 4.00$ Ω. What is the emf of the ideal battery?

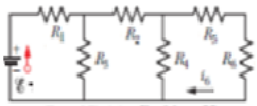

Fig. 27-30 Problem 19

Answer: 96.6 V

25. In Fig. 27-35, $\varepsilon = 24.0$ V, $R_1 = 2000$ Ω, $R_2 = 3000$ Ω, and $R_3 = 4000$ Ω. What are the potential differences (a) $V_A - V_B$ (b) $V_B - V_C$, (c) $V_C - V_D$, and (d) $V_A - V_C$?

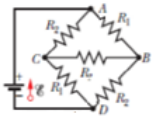

Fig. 27-35 Problem 25

Answer: (a) 10.5 V ; (b) 3.00 V ; (c) 10.5 V ; (d) 13.5 V.

27. In Fig. 27-36, battery 1 has emf ε_1=12.0 V and internal resistance r_1= 0.025 Ω and battery 2 has emf ε_2=12.0 V and internal resistance r_2= 0.012 Ω. The batteries are connected in series with an external resistance R. (a) What R value makes the terminal- to-terminal potential difference of one of the batteries zero? (b) Which battery is that?

Fig. 27-33

Fig. 27-36 Problem 27

Answer: (a) 0.013 Ω ; (b) Battery 1.

47. In the circuit of Fig. 27-46, ε =1.2 kV, C = 6.5 μF,$R_1 = R_2 = R_3 =$ 0.73 M Ω. With C completely uncharged, switch S is suddenly closed (at t = 0). At t = 0, what are (a) current i_1 in resistor 1, (b) current i_2 in resistor 2, and (c) current i_3 in resistor 3? At t = ∞ (that is, after many time constants), what are (d) i_1, (e) i_2, and (f) i_3? What is the potential difference V_2 across resistor 2 at (g) t = 0 and (h) t = ∞?

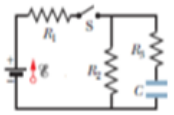

Fig. 27-46 Problem 47

Answer: (a) 1.1 mA ; (b) 0.55 mA ; (c) 0.55 mA ; (d) 0.82 mA ; (e) 0.82 mA ; (f) 0 ; (g) 400 V ; (h) 600 V.

50. When resistors 1 and 2 are connected in series, the equivalent resistance is 20.0 Ω. When they are connected in parallel, the equivalent resistance is 3.75 Ω.What are (a) the smaller resistance and (b) the larger resistance of these two resistors?

Answer: (a) 5.0 Ω ; (b) 15.0 Ω.

60. Figure 27-56 shows five 8.00 Ω resistors. Find the equivalent resistance between points (a) F and H and (b) F and G. (Hint: For each pair of points, imagine that a battery is connected across the pair.)?

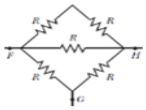

Fig. 27-56

Answer: : (a) 4.00 Ω ; (b) 5.00 Ω

63. The current in a single-loop circuit with one resistance R is 5.0 A. When an additional resistance of 2.0 Ω is inserted in series with R, the current drops to 3.0 A.What is R?

Answer: 3.0 Ω.

65. A total resistance of 5.00 Ω is to be produced by connecting an unknown resistance to a 15.0 Ω resistance. (a) What must be the value of the unknown resistance, and (b) should it be connected in series or in parallel?(c) What is the total resistance if the unknown resistance is connected the other way?

Answer: (a) 7.0 Ω ; (b) In parallel. (c) 22.5 Ω