

1.38 Find V_x in the network in Fig. P1.38 using Tellegen's theorem.

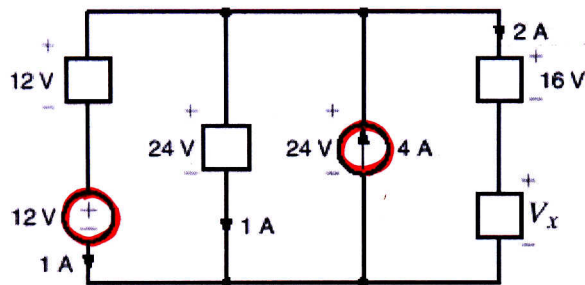


Figure P1.38

SOLUTION:

$$P_1 = 12(1) = 12\text{ W absorbed}$$

$$P_{12\text{V}} = 12(1) = 12\text{ W absorbed}$$

$$P_2 = 24(1) = 24\text{ W absorbed}$$

$$P_{4\text{A}} = 24(-4) = -96\text{ W}$$

$$P_{4\text{A}} = 96\text{ W supplied}$$

$$P_3 = 16(2) = 32\text{ W absorbed}$$

$$P_4 = V_x(2) = 2V_x$$

Power supplied = Power absorbed

$$P_{4\text{A}} = P_1 + P_{12\text{V}} + P_2 + P_3 + P_4$$

$$96 = 12 + 12 + 24 + 32 + 2V_x$$

$$V_x = 8\text{ V}$$