

In the circuit diagrams, all resistance values are in ohms, unless otherwise indicated.

### **I Superposition:**

1. (Figure 1) Find the source currents. (4.1 A; 7.6 A)
2. (2) Find the source currents. (0.7 A; 0.1 A)
3. (3) Find the currents in the sources and in the 5 Ohm resistor.  
(1.29 A; 2.25 A; 0.417 A)
4. (4) Find the currents in the sources and in the 10 Ohm resistor.  
(1.12 A; 4.70 A; 5.82 A) Hint: transform the delta to star.
5. (5) Determine the unknown branch currents.  
(4.09 A; 1.91 A; 5.91 A; 0.088 A)
6. (6) Find the source voltages. (40.7 V; 184.3 V)
7. (8) Find all unknown branch currents. (2 A; 3 A; 2.67 A; 5.67 A)
8. (27) Find all unknown branch currents.  
(1.60 A; 5.40 A; 7.63 A; 0.63 A; 6.03 A)

### **II Active network simplification (Thevenin and Norton theorems)**

1. (1) Find the current in the 15 ohm resistor. (0.24 A)
2. (1) Find the current in the 90 volt source. (7.60 A)
3. (2) Find the current in the 50 ohm resistor. (0.80 A)
4. (2) Find the current in the lower 200 ohm resistor. (0.1 A)
5. (3) Find the current in the 5 ohm resistor. (417 mA)
6. (3) Find current in the 3 ohm resistor. (1.83 A)
7. (5) Find the current in the 9 ohm resistor. (5.91 A)
8. (6) Find the current in the 25 ohm resistor. (1.67 A)
9. (7) Find the voltage across the 3 ohm resistor. (0.79 V)

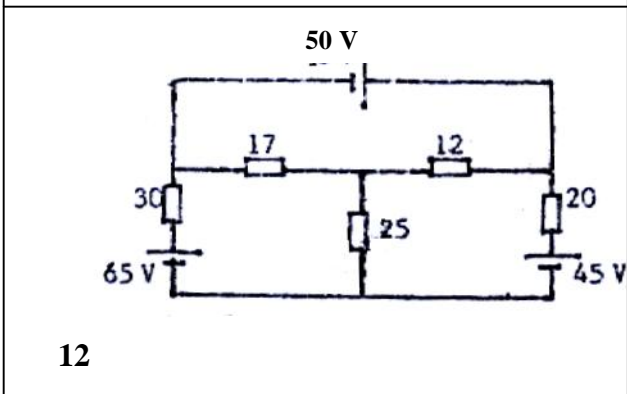
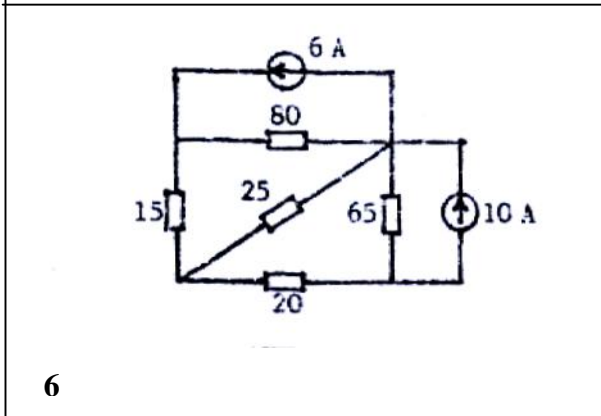
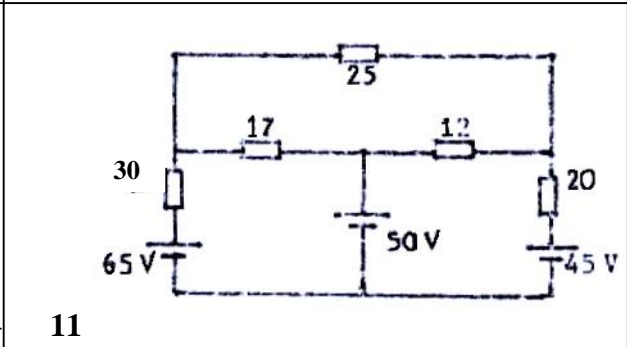
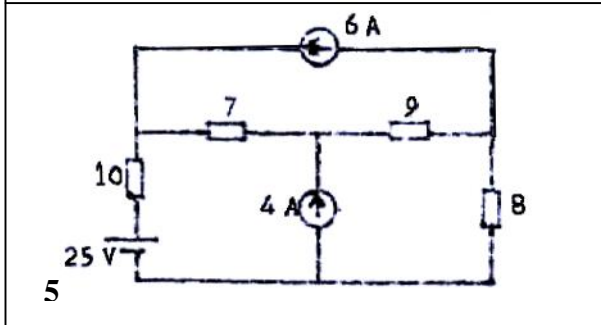
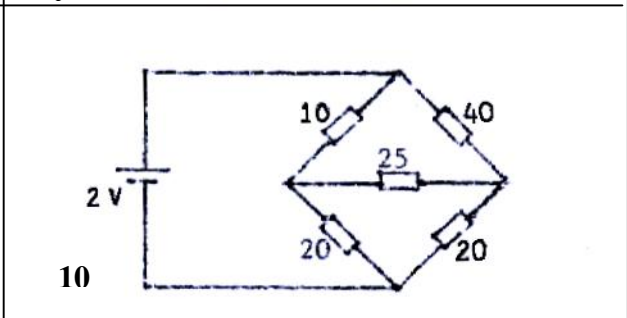
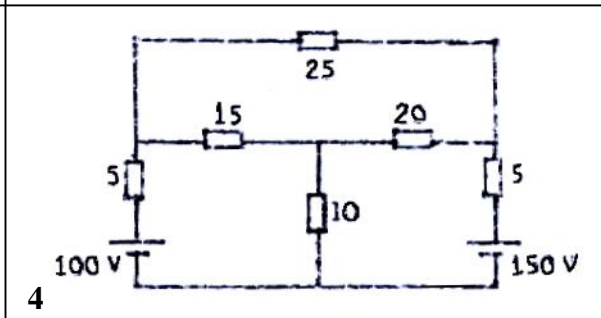
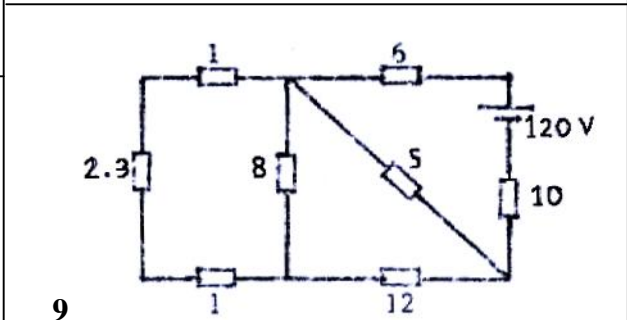
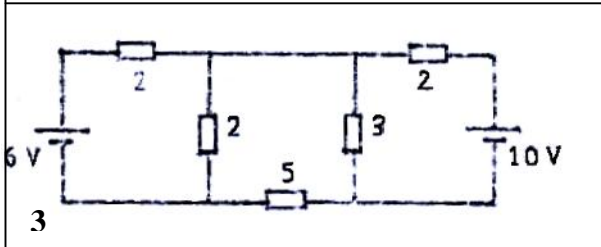
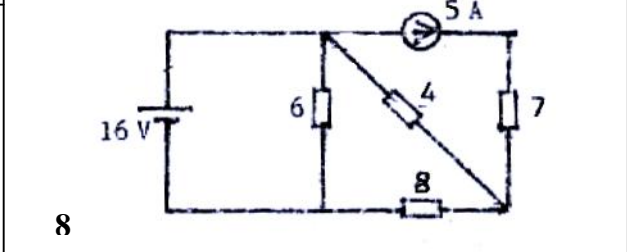
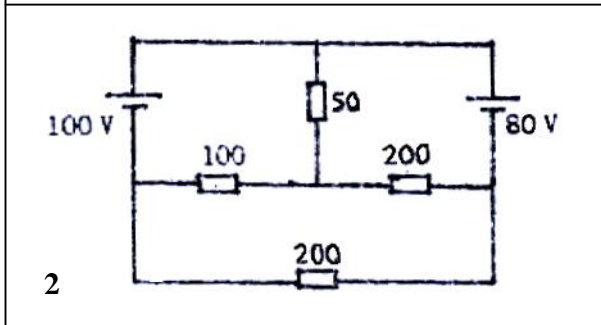
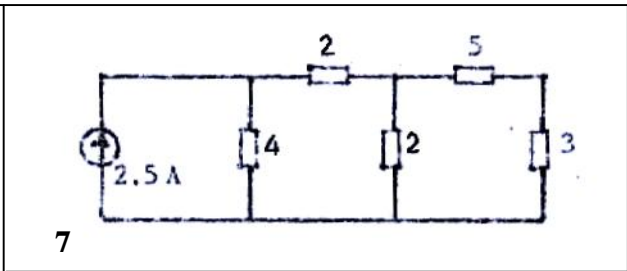
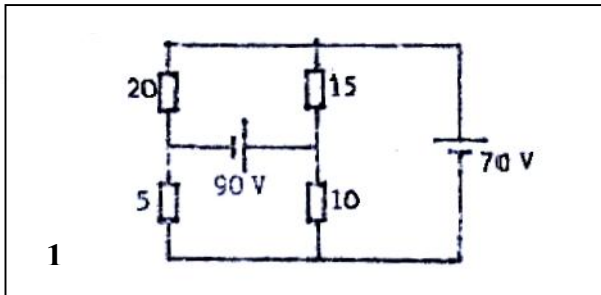
10. (8) Find the power dissipated in the 4 ohm resistor. (16 W)
11. (9) Find the current in the 2.3 ohm resistor. (1 A)
12. (10) Find the current in the 25 ohm resistor. (14.8 mA)
13. (10) Find the current in the 10 ohm resistor. (76.5 mA)
14. (11) Find the power dissipated in the 25 ohm resistor. (709 mW)
15. (11) Find the power supplied by the 50 volt source. (-8.03 W)
16. (12) Find the power dissipated in the 25 ohm resistor. (35.3 W)
17. (12) Find the power supplied by the 50 volt source. (155.4 W)
18. (13) Find the power dissipated in the 15 ohm resistor. (0.37 mW)
19. (14) Find the current in the 6 ohm resistor. (52.9 mA)
20. (15) Find the current in the 3 ohm resistor. (1.00 A)

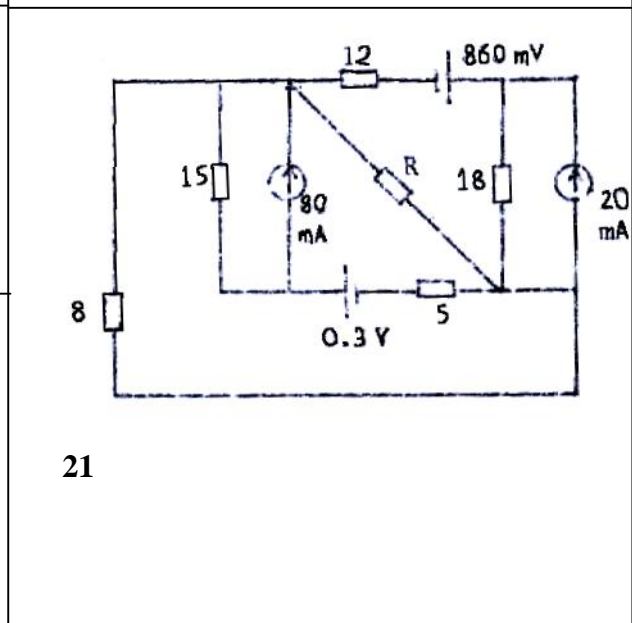
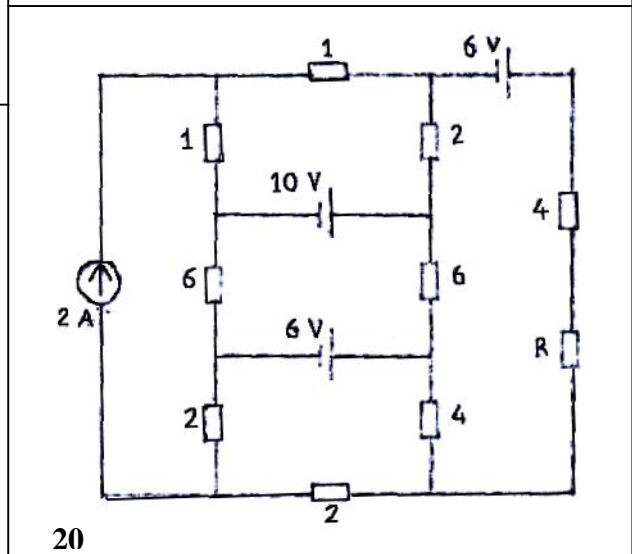
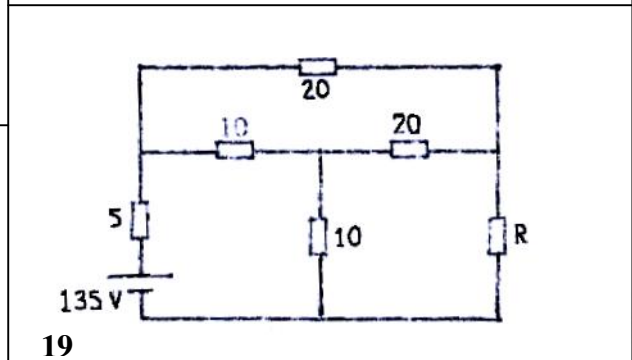
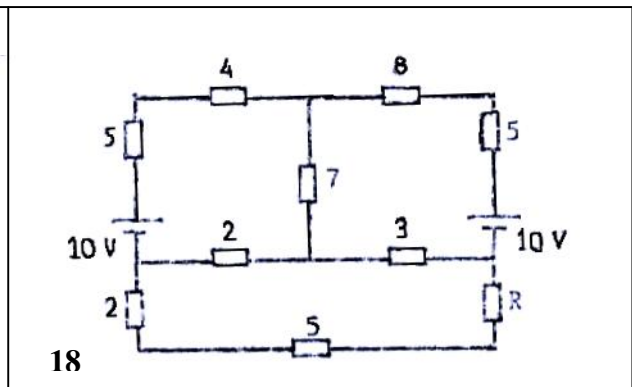
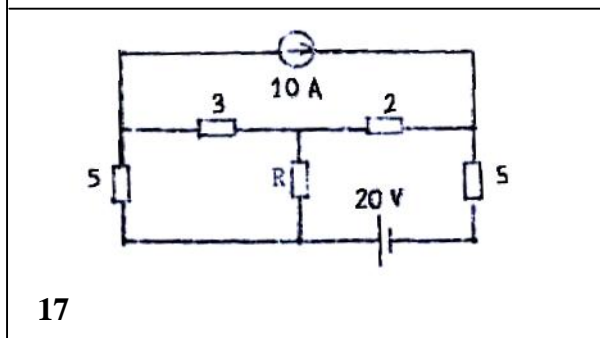
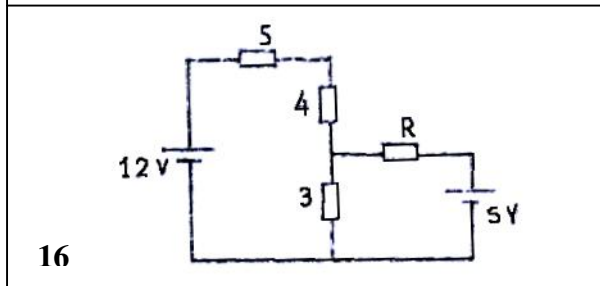
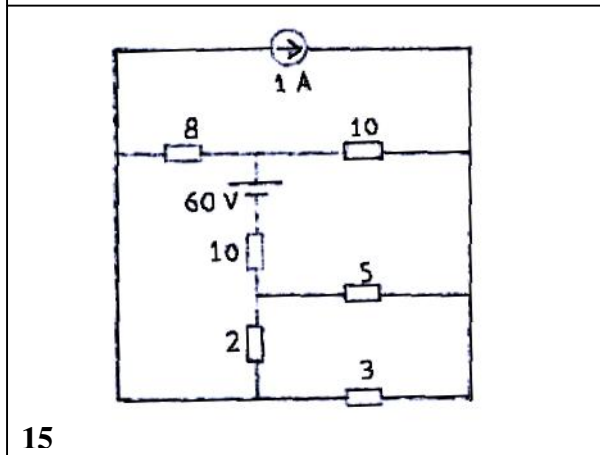
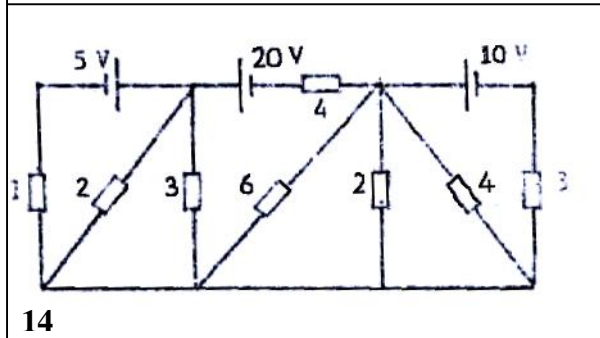
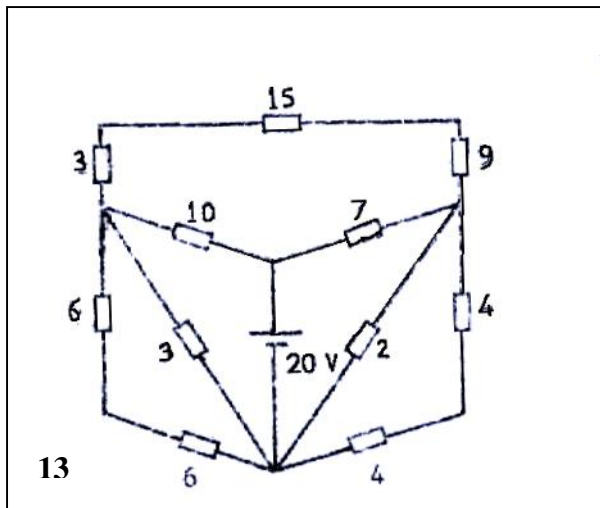
Hint: use Norton's theorem.

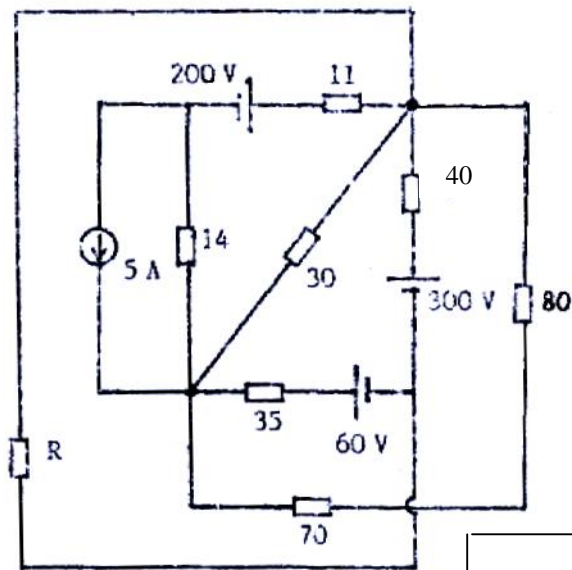
21. (15) Find the current in the 8 ohm resistor. (2.25 A)
22. (27) Find the voltage across the 7 Ampere source. (29.3 V)

### **III Maximum -power transfer**

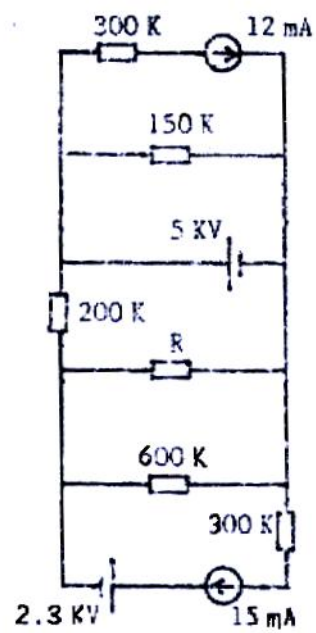
1. (16) Find maximum power in R. ( 444 mW )
2. (17) Find maximum power in R. ( 3.6 W )
3. (18) Find maximum power in R. ( 16.95 mW )
4. (19) Find maximum power in R; also find the power supplied by the source, (125 W ; 1.04 KW )
5. (20) Find maximum power in R. ( 5.625 W ; R = 10 ohms )
6. (21) Find maximum power in R. ( 4.08 mW ; R = 4.8 ohms )
7. (22) Find maximum power in R. ( 557 W ; R = 21.7 ohms )
8. (23) Find maximum power in R. ( 60W ) Hint: use Norton's theorem.
9. (24) Find maximum power in R. ( 2.48 W ; R = 8.23 ohms )
10. (25) Find maximum power in R. ( 414.6 W ; R = 27.4 ohms )
11. (26) Find maximum power in R. ( 22.1 W ; R = 9.77 ohms )



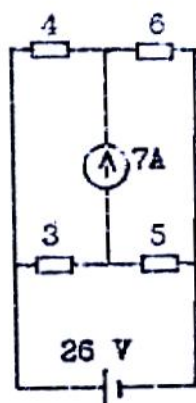




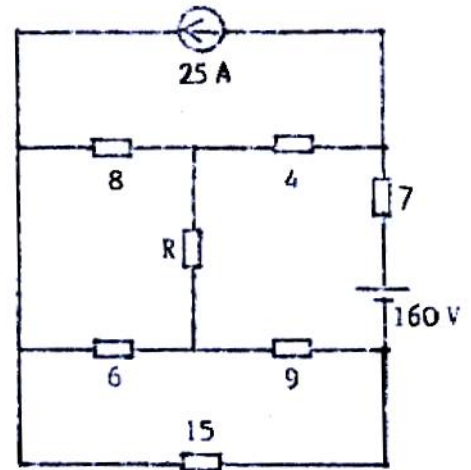
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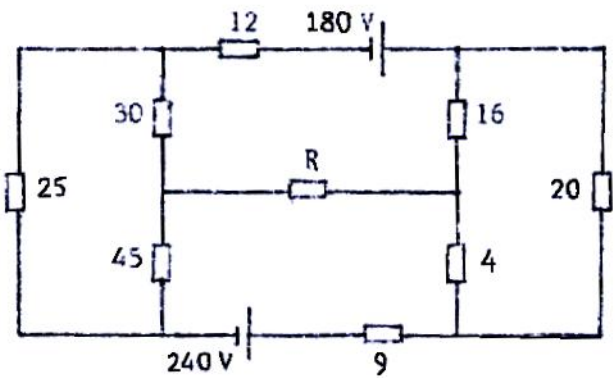
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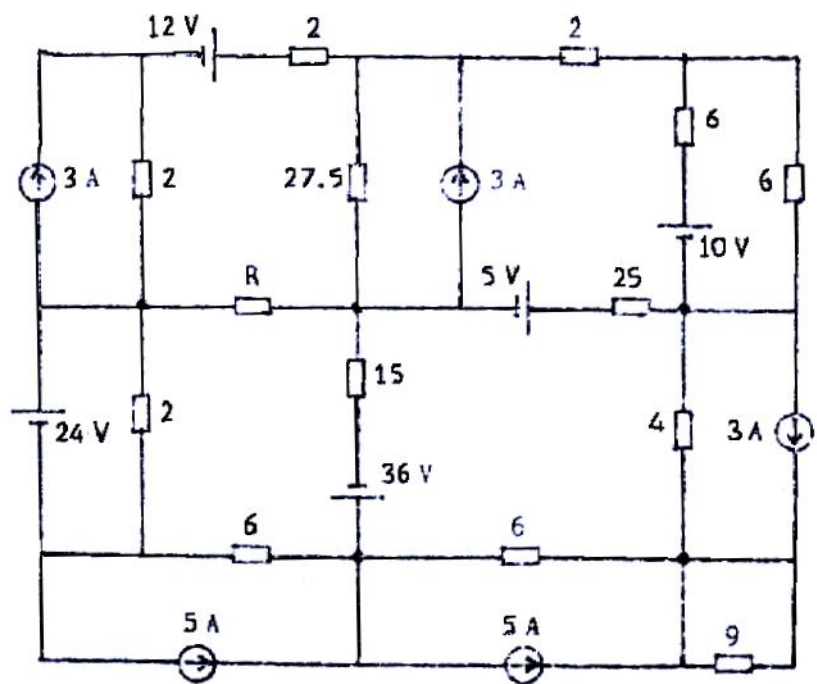
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