

- This is a closed book exam.
- Read each question carefully before answering it, and list any important assumptions you make.
- Exam questions in three pages, answer all of them.
- Good Luck!

1. Find the Norton equivalent circuit for the portions of the networks in Figure 1 external to branch a-b. [10 marks]

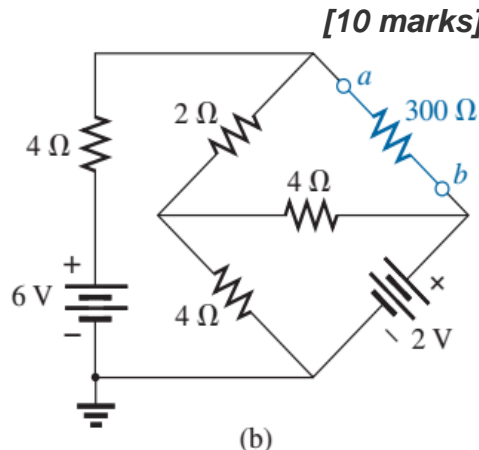
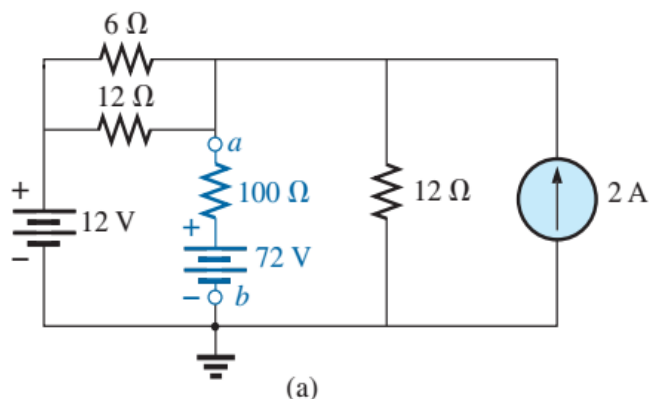


Figure 1

2. Determine the current  $I$  for the network in Figure 2. [10 marks]

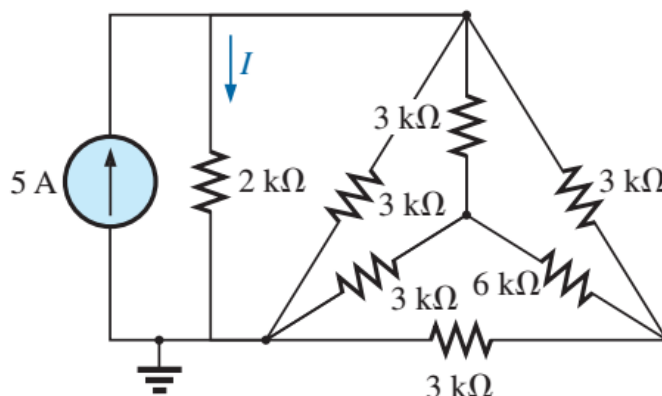


Figure 2

3. For the circuit in Figure 3, determine the value of  $R$  such that the maximum power delivered to the load is 3 mW. [10 marks]

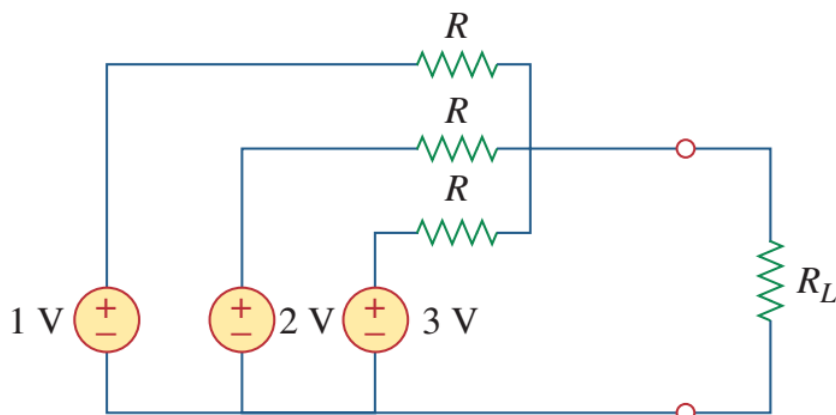


Figure 3

4. Using nodal analysis, find  $v_o$  and  $i_o$  in the circuit of Figure 4.

[10 marks]

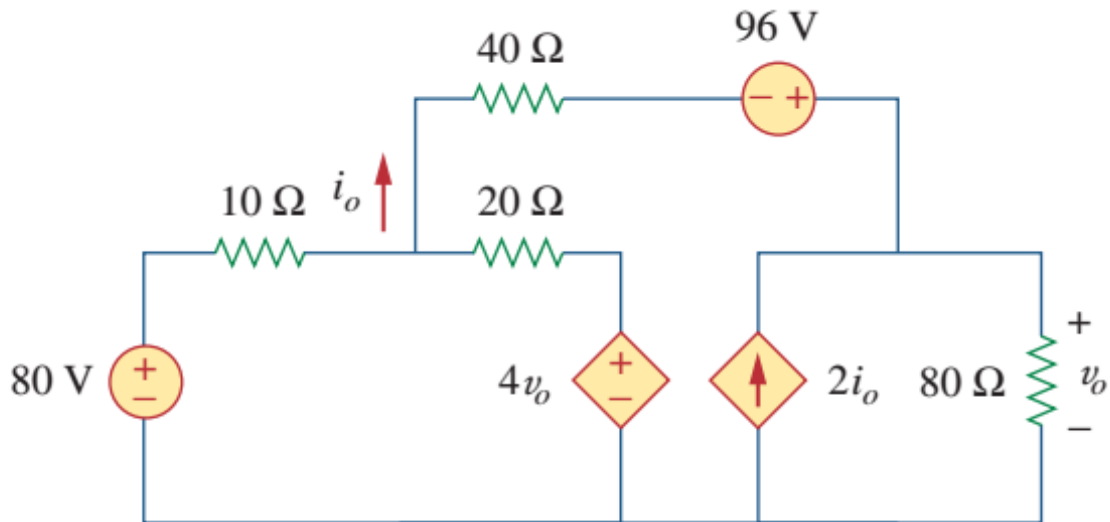


Figure 4

5. Choose the correct answers

[10 marks]

- i. The primary purpose of a resistor is to
  - (a) increase current
  - (b) limit current
  - (c) produce heat
  - (d) resist current change.
- ii. While putting four 1.5 V batteries in a flashlight, you accidentally put one of them in backward. The voltage across the bulb will be
  - (a) 6 V
  - (b) 3 V
  - (c) 4.5 V
  - (d) 0 V.
- iii. While checking out a series-resistive circuit, you find that the current is higher than it should be. You should look for
  - (a) an open circuit
  - (b) a short
  - (c) a low resistor value
  - (d) answers (b) and (c).
- iv. In a parallel circuit, each resistor has
  - (a) the same current
  - (b) the same voltage
  - (c) the same power
  - (d) all of the above
- v. Maximum power is transferred from a source to a load when
  - (a) the load resistance is very large
  - (b) the load resistance is very small
  - (c) the load resistance is twice the source resistance
  - (d) the load resistance equals the source resistance

