14.) Gigabit Ethernet may use so-called "CAT-5" cable (CAT-6 and CAT-6e are recommended but not required). CAT-5 cable has 4 twisted pairs of copper wire, all of which are used for Gigabit Ethernet. Gigabit ethernet achieves a maximum information rate of one gigabit per second (1×10^9 bits per second). For a typical CAT-5 cable installation the signal-to noise ratio at the receiving end could be about 10^5 and the rated bandwidth is 100 MHz (each pair).

a.) What is the capacity of one pair of wires in this CAT-5 cable?

b.) What is the aggregate capacity (the capacity of all twisted pairs combined) of this CAT-5 cable?

c.) What fraction of the CAT-5's capacity does Gigabit Ethernet uses?

15.) A *business model* encompasses a description of 1) A name for the business model, 2) Who a business' customers are, 3) What is of value to the customers, 4) The processes or methods a company uses to produce that which is of value to its customers, 5) The distribution channels for delivering value to customers. 6) A description of relationships needed to support the business (vendor, supplier, etc.), and 7) A description of how money flows through the business, including a description of the sources of profit if it is a for-profit business.

Now consider the early history of radio (1880's through about 1925) as presented in the handout "Introduction to Electrical Engineering." At the time some people thought radio would never be profitable because the person sending a message in some cases could not be sure it was received and in any case, there was no privacy. However, the radio business blossomed.

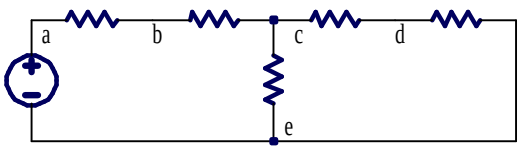
Based on your reading of the "Introduction to Electrical Engineering" handout, describe a business model (Briefly Itemize points 1 through 7) that was found successful during the early history of radio. (There is more than one business model implied in the handout "Introduction to Electrical Engineering. Pick one and describe it.) You may invent your own name for the business model you describe.

Here is an example of a business model (of a non-radio type):
1.) Business Model Name: Magazine Subscription.
2.) Customers are people or businesses with a particular interest in a defined subject.
3.) Customers value a recurring dependable information supply on the particular defined subject without continuous shopping or ordering.
4.) Company uses reporters, editors, printers to collect information and print it.
5.) Delivery is via printed pages bound and mailed.
6.) Partner businesses are a print shop, US mail, stock photo agency for illustrations.
7.) Customers pay an annual subscription and advertisers pay for space in the magazine. The income is used to pay employees, printing expenses, and for office space, copyright permissions, for other overhead, and for profit.

16a.) In the early years of the World Wide Web many people thought it would never be profitable. Many companies resisted establishing web sites for themselves since they would obviously have maintenance costs but would not have any obvious source of profit. Describe a current business model for a World Wide Web-based business.

16b) Do you see any parallels between the early years of the World Wide Web and the early years of broadcasting?

17.) How many nodes does the circuit shown below have? Label them "a", "b", etc.



18.) In the circuit shown below, which resistors are connected in parallel? Which are connected in series?