Telephony 101 – Pop Quiz January 1, 2013

Happy New Year to All,

When we started I said there would be no lectures or exams. Nevertheless, the notes I prepare at the beginning of each reading assignment are really like lecture notes, and now I think we need a quiz to make sure we remember the important concepts that are needed to understand telephones.

Please try to answer the following questions without looking at the book or our notes. When you are finished, you can check the book and notes if necessary to see if you got the questions right or to correct any with which you had trouble. I do not want to see your answers or grade any papers. However, if you have any lingering confusion about any of the questions, please feel free to contact me directly at oldtimetelephones@goeaston.net. If the confusion might be widespread, I will address it in an e-mail to the TCI List Server before moving on to the next reading assignment. As always, previous reading assignments, notes, questions, answers – and now this pop quiz – are available in the TCI Library at http://www.telephonecollectors.info/telephony-101/.

1. Describe Oersted's observation about how electricity can generate magnetism.

2. Describe the Faraday-Henry observation about how magnetism can generate electricity.

3. Write the equation known as Ohm's Law.

4. Which of the above three principles is used in modern transmitters?

5. Which of the above three principles is used in modern receivers?

6. Describe the operation of a transformer in terms of Oersted's observation and the Faraday-Henry observation.

7. What property of a transformer (or an induction coil) determines the amount of voltage step-up?

8. Does the impedance of a resistor in an ac circuit get bigger or smaller with increasing ac frequency?

9. Does the impedance of a condenser in an ac circuit get bigger or smaller with increasing ac frequency?

10. Does the impedance of a coil in an ac circuit get bigger or smaller with increasing ac frequency?

11. Does the voltage across a resistor in an ac circuit go up and down in phase with the ac current?

12. Does the voltage across a condenser in an ac circuit go up and down in phase with the ac current?

13. Does the voltage across a coil in an ac circuit go up and down in phase with the ac current?

14. If you want to block direct current (dc) in a circuit, which component would you use?

15. If you want to block (well almost) high-frequency alternating current (ac) in a circuit, which component would you use?

If there are any questions about the quiz, we will deal with the questions before moving on to the next reading assignment.

Ralph

Telephony 101 – Pop Quiz Answers January 4, 2013

Hello All,

Here are my answers to the pop quiz. Anything close to this would be correct.

1. Describe Oersted's observation about how electricity can generate magnetism.

Answer: Current moving through a wire produces a magnetic field around the wire.

2. Describe the Faraday-Henry observation about how magnetism can generate electricity.

Answer: A changing (not steady) magnetic field will generate a voltage in a nearby wire. Think of waving a horseshoe magnet over a wire.

3. Write the equation known as Ohm's Law.

Answer: V = RI (i.e., voltage equals resistance times current).

4. Which of the above three principles is used in modern transmitters?

Answer: Ohm's law. Changes in the transmitter's resistance (due to sound waves) cause changes in the current through the transmitter.

5. Which of the above three principles is used in modern receivers?

Answer: Oersted's observation. Current in the receiver's coil creates a magnetic field that pulls on the receiver diaphragm.

6. Describe the operation of a transformer in terms of Oersted's observation and the Faraday-Henry observation.

Answer: Current through the primary winding produces a magnetic field. When this current is alternating (i.e., ac), the magnetic field changes with time. This changing magnetic field generates a voltage in the wire of the secondary winding.

7. What property of a transformer (or an induction coil) determines the amount of voltage step-up?

Answer: The turns ratio (i.e., number of turns in the secondary winding divided by the number of turns in the primary winding)

8. Does the impedance of a resistor in an ac circuit get bigger or smaller with increasing ac frequency?

Answer: Neither, it stays the same.

9. Does the impedance of a condenser in an ac circuit get bigger or smaller with increasing ac frequency?

Answer: Smaller.

10. Does the impedance of a coil in an ac circuit get bigger or smaller with increasing ac frequency?

Answer: Bigger.

11. Does the voltage across a resistor in an ac circuit go up and down in phase with the ac current?

Answer: Yes.

12. Does the voltage across a condenser in an ac circuit go up and down in phase with the ac current?

Answer: No.

13. Does the voltage across a coil in an ac circuit go up and down in phase with the ac current?

Answer: No.

14. If you want to block direct current (dc) in a circuit, which component would you use?

Answer: Condenser.

15. If you want to block (well almost) high-frequency alternating current (ac) in a circuit, which component would you use?

Answer: Coil (aka inductor, choke, and retardation coil).

I hope everyone got all of the answers right because if you didn't, I have failed you. If there are any questions or comments about the pop quiz, please contact me at oldtimetelephones@goeaston.net. I will post the next reading assignment soon.

Ralph