

## Lesson 12 – ANSWERS

Q1 Describe how a dynamic speaker works.

**The incoming audio signals energise the coil which is repelled or attracted to the permanent magnet. The coil is attached to a diaphragm. As the coil and diaphragm move back and forward in accordance with the audio signal, the diaphragm produces sound waves which are heard by the listener.**

Q2 What are  $Z_S$ ,  $Z_O$  and  $Z_L$ ?

$Z_S$  = Impedance of the signal source, transmitter

$Z_O$  = Impedance of the line

$Z_L$  = Impedance of the load, antenna

Q3 Name an unbalanced transmission line.

**Coaxial cable**

Q4 Name a balanced transmission line.

**Ladder line**

Q5 What is a waveguide?

**A waveguide is a special form of transmission line consisting of a hollow metal tube**

Q6 How do you test a transmission line to measure the impedance?

**First measurement is between the centre conductor and shield with the other end of the line open. This results in a value  $Z_{OC}$ , the Open Circuit Impedance.**

**Second measurement is between the centre conductor and shield with the other end of the line shorted between the centre and shield. This results in a value  $Z_{SC}$ , the Short Circuit Impedance.**

Q7 From the previous test, you got results of  $500 \Omega$  and  $100 \Omega$ . What is the impedance of the line?

**$223.6 \Omega$**

Q8 What is the velocity factor of cables?

**The velocity factor (VF) of a transmission line is the ratio of the signal in the line compared to the speed of light.**

Q9 Explain what is the SWR?

**SWR is the ratio of the maximum to minimum voltage on a transmission line. SWR is measured using a dedicated SWR meter**

Q10 Measuring the signal on a transmission line, the maximum is 12 V and the minimum is 2 V. What is the SWR?

**6:1**

Q11 Measuring the power of the signal on a transmission line, the maximum is 12 W and the minimum is 2 W. What is the SWR?

5:1

Q12 How are cable losses quantified?

**Decibels per metre**

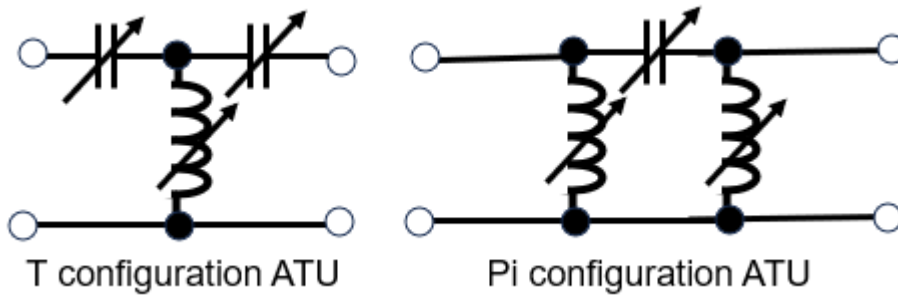
Q13 What is a balun?

**A balun is a device that allows balanced and unbalanced lines to be connected without disturbing the impedance of either line.**

Q14 Connecting a balanced line of 450  $\Omega$  to an unbalanced line of 50  $\Omega$ . What are the turns ratio for the balun?

3:1

Q15 Name and draw two common ATU configurations.



Q16 What is a piezo electric speaker?

**In a piezoelectric speaker, the coil and magnet are replaced with a crystal.**