

Definitions and Reference

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Questions

E7H01 – What are three major oscillator circuits used in amateur radio equipment?

Colpitts, Hartley, and Pierce

E7H02 – What condition must exist for a circuit to oscillate?

It must have a positive feedback loop with a gain greater than 1

E7H03 – How is positive feedback supplied in a Hartley oscillator?

Through a tapped coil

E7H04 – How is positive feedback supplied in a Colpitts oscillator?

Through a capacitive divider

E7H05 – How is positive feedback supplied in a Pierce oscillator?

Through a quartz crystal

E7H06 – Which type of oscillator circuits are commonly used in VFOs?

Colpitts and Hartley

E7H07 – What is a magnetron oscillator?

A UHF or microwave oscillator consisting of a diode vacuum tube with a specially shaped anode, surrounded by an external magnet

E7H08 – What is a Gunn diode oscillator?

An oscillator based on the negative resistance properties of properly doped semiconductors

E7H09 – What type of frequency synthesizer circuit uses a stable voltage-controlled oscillator, programmable divider, phase detector, loop filter and reference frequency source?

A phase-locked loop synthesizer

E7H10 – What type of frequency synthesizer circuit uses a phase accumulator, lookup table, digital to analog converter and a low pass anti-alias filter?

A direct digital synthesizer

E7H11 – What information is contained in the lookup table of a direct digital frequency synthesizer?

The amplitude values that represent a sine wave output

E7H12 – What are the major spectral impurity components of direct digital synthesizers?

Spurs at discrete frequencies

E7H13 – Which of these circuits would be classified as a principal component of a direct digital synthesizer (DDS)?

Phase accumulator

E7H14 – What circuit is often used in conjunction with a direct digital synthesizer (DDS) to expand the available tuning range?

Phase-locked loop

E7H15 – What is the capture range of a phase-locked loop circuit?

The frequency range over which the circuit can lock

E7H16 – What is a phase-locked loop circuit

An electronic servo loop consisting of a phase detector, a low pass filter and voltage-controlled oscillator

E7H17 -Which of these functions can be performed by a phase-locked loop?

Frequency synthesis, FM demodulation

E7H18 - Why is a stable reference oscillator normally used as part of a phase locked loop (PLL) frequency synthesizer?

Any phase variations in the reference oscillator signal will produce phase noise in synthesizer output

E7H19 - Why is a phase locked loop often used as part of a variable frequency synthesizer for receivers and transmitters?

It makes it possible for a VFO to have the same degree of stability as a crystal oscillator

E7H20 - What are the major spectral impurity components of phase-locked loop synthesizers?

Broadband noise