

What difference does a component's tolerance make?

What does a 10MHz crystal with 10ppm tolerance mean?

What do the colours brown, red, gold and silver mean on a resistor as the last band, in terms of tolerance?

Think about some of the ways that the effects of tolerance can be adjusted.

What factors influence the capacitance of a capacitor, and what is the formula?

What happens to capacitance if distance between plates doubles?

What happens to capacitance if plate area doubles?

Is the formula for Capacitance on the EX309 sheet, and do you know how to decode its incorrect printing?

What is the unit for the quantity of electricity called, and how is it defined?

What is the formula for stored charge on a capacitor?



What sort of materials are used to make dielectrics, which ones tend to be lossy, and what causes losses to increase?

Which capacitors are low-loss, stable and good for RF, normally around the low pf range?

What happens to a capacitor when its safe working voltage, or breakdown voltage, is exceeded?

How do you identify the safe working voltage of a capacitor?

Revision mode: the inductor. Give a brief summary of what it does, what affects its value and the unit. Check formulas for inductors in series and in parallel.

what does self inductance mean and what is back EMF?



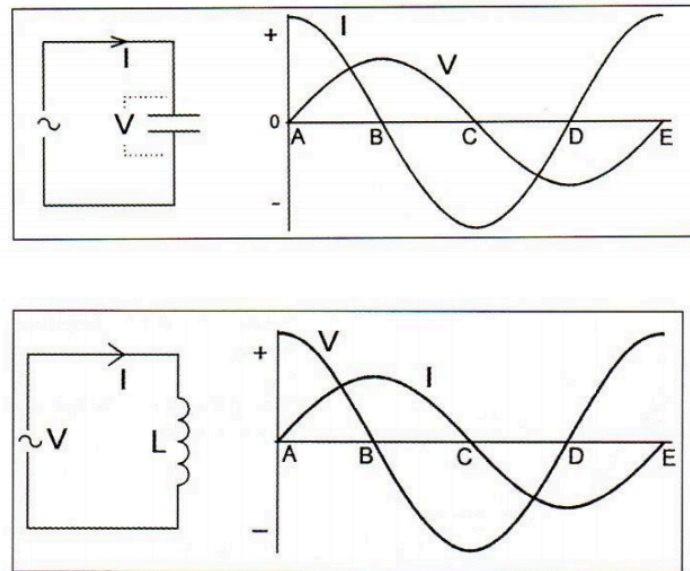
In what direction are the magnetic force when current flows through a wire?

Why is there a time constant for inductors and capacitors

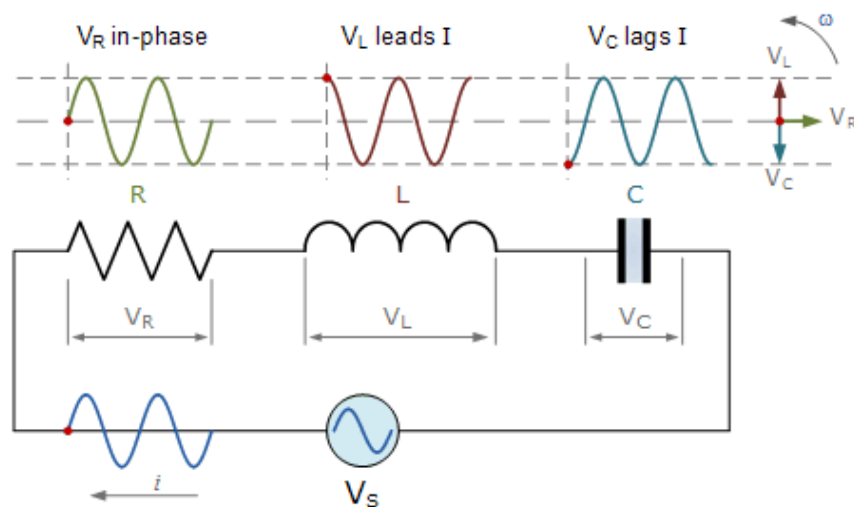
What happens after one time constant has elapsed in an RL circuit, and also 5 time constants?

What happens after one time constant has elapsed in an RC circuit, and also 5 time constants?

From the intermediate course, we know that in circuits with pure Capacitance or pure Inductance, there is a 90 degree phase difference between voltage and current. Now we need to know which leads which...



What is the phasor diagram for voltage in an AC series circuit consisting of a resistor, an inductor and a capacitor?



What is the formula for the reactance of a capacitor, what does the graph of Capacitive Reactance vs frequency look like, and can you find it in EX309?

What is the formula for the reactance of an inductor, what does the graph of Reactive Reactance vs frequency look like, and can you find it in EX309?

How do you get 'pi' to appear on your calculator?

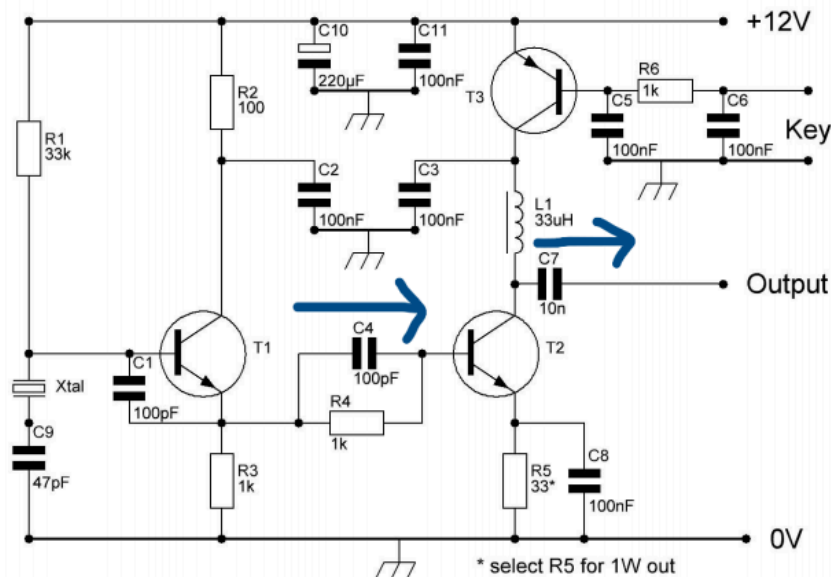
Calculator practice: calculate the INDUCTIVE REACTANCE of a  $10\mu H$  inductor at 7MHz. Hint: use the REPLAY button and its arrows to check the numbers have been entered properly.

Calculator practice: calculate the CAPACITIVE REACTANCE of a 22pF capacitor at 10MHz. Hint: use the brackets!

If the CAPACITIVE REACTANCE of a 22pF capacitor is x, what is the frequency?

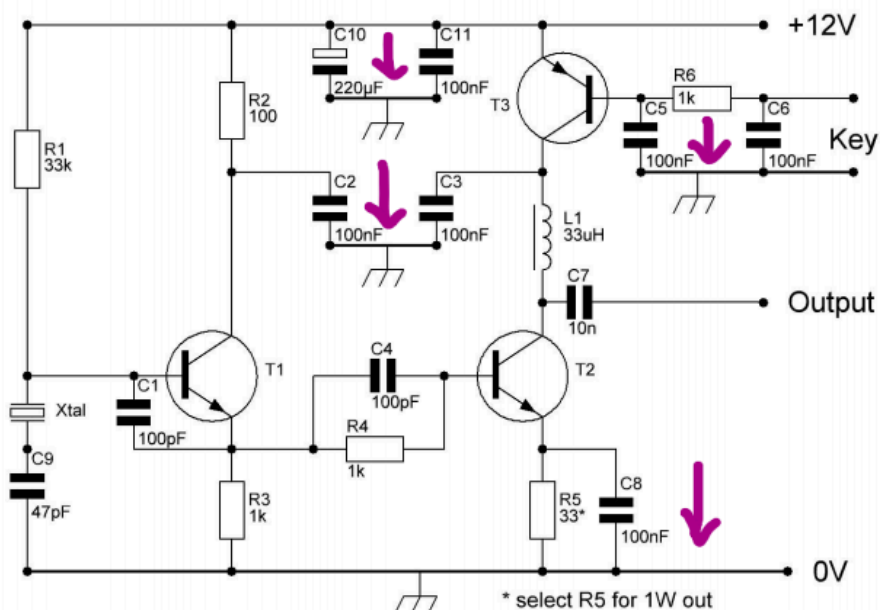
How are capacitors being used in this diagram? Hint: look at the arrows. It won't have the description or the arrows on the real thing.

### GM30XX OXO TRANSMITTER - CIRCUIT DIAGRAM

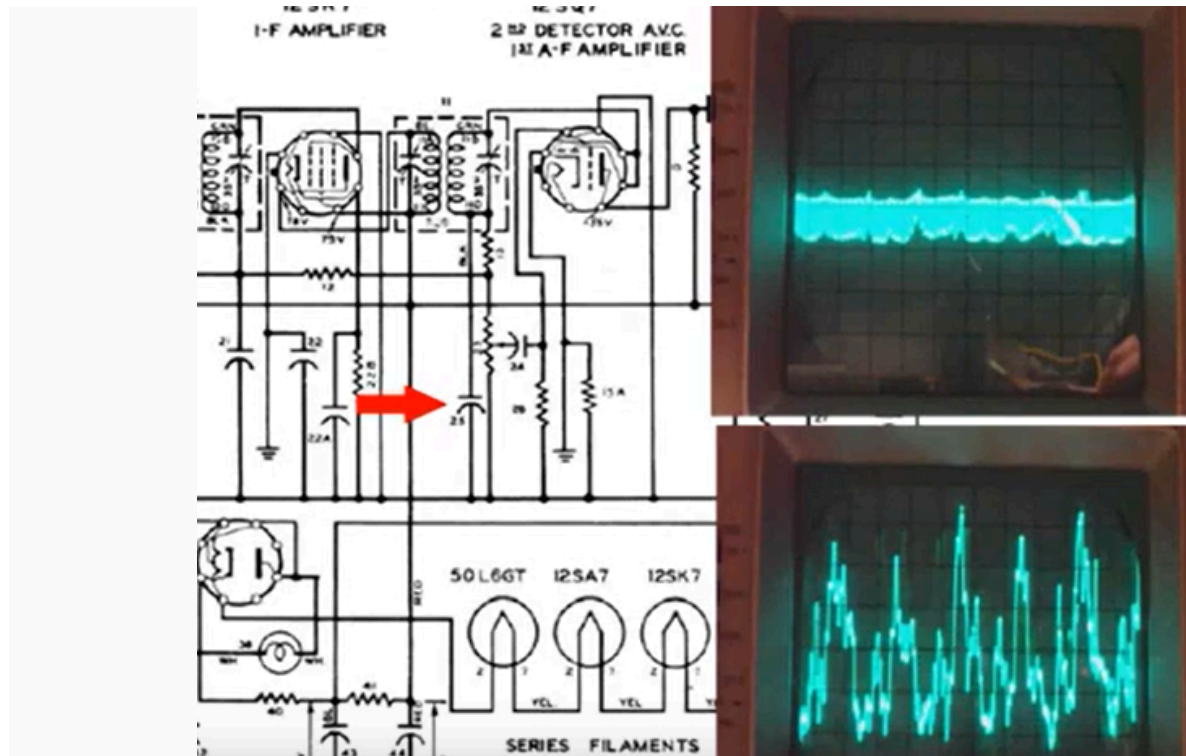


What is happening in this diagram?

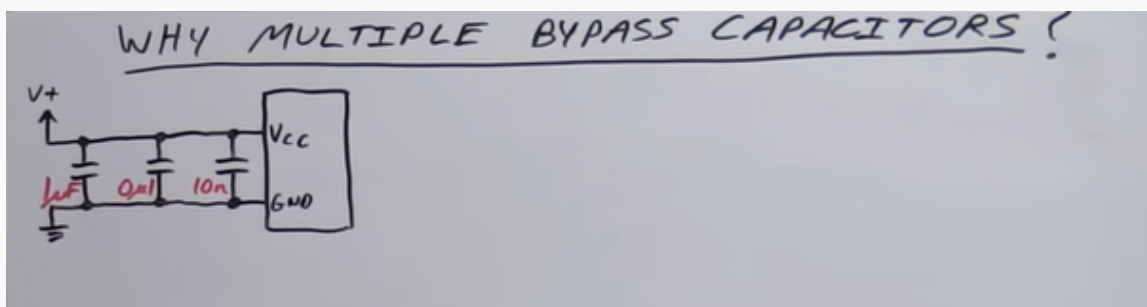
### GM30XX OXO TRANSMITTER - CIRCUIT DIAGRAM



What is RF bypass?

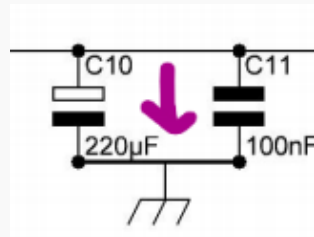


Why do we use multiple bypass capacitors on a power supply? Values like  $1\mu F$ ,  $100nF$ ,  $10nF$  and  $1nF$  are common and actually 3-4 may be used to take signals down to earth.

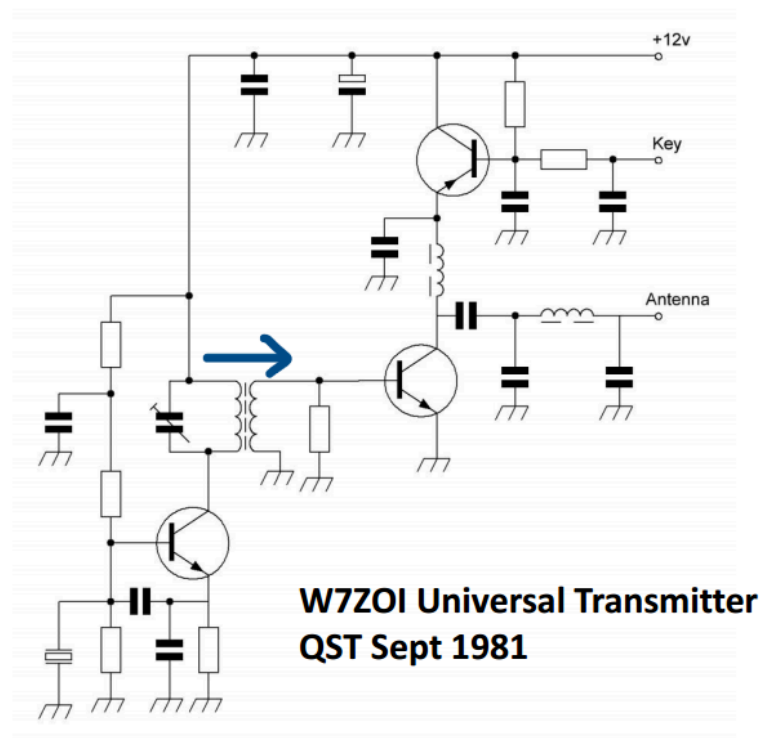




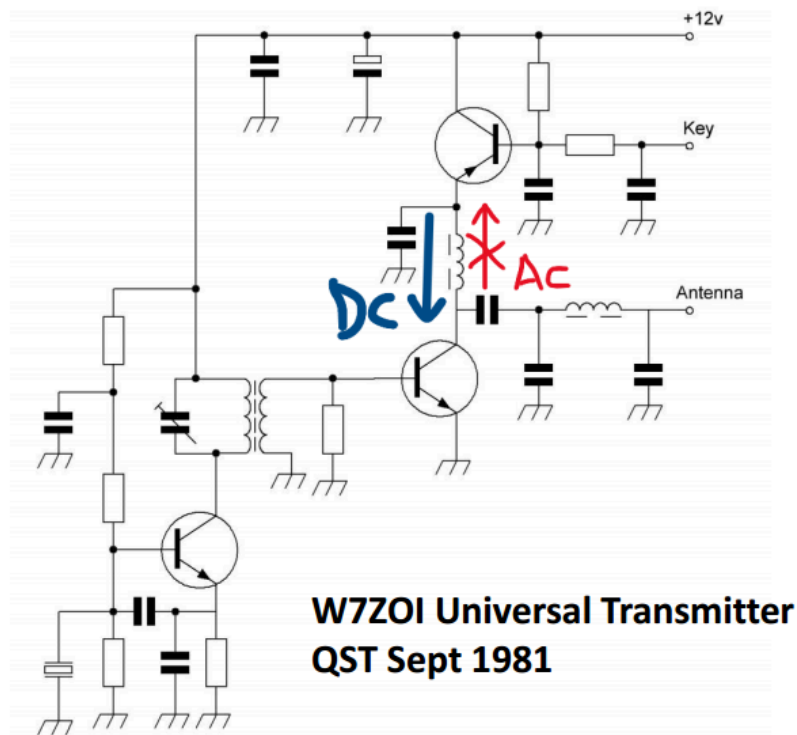
Here is a small piece of circuit with the capacitor connected between a 12V DC power supply and earth. Why would it be here?



How are inductors used in this diagram?



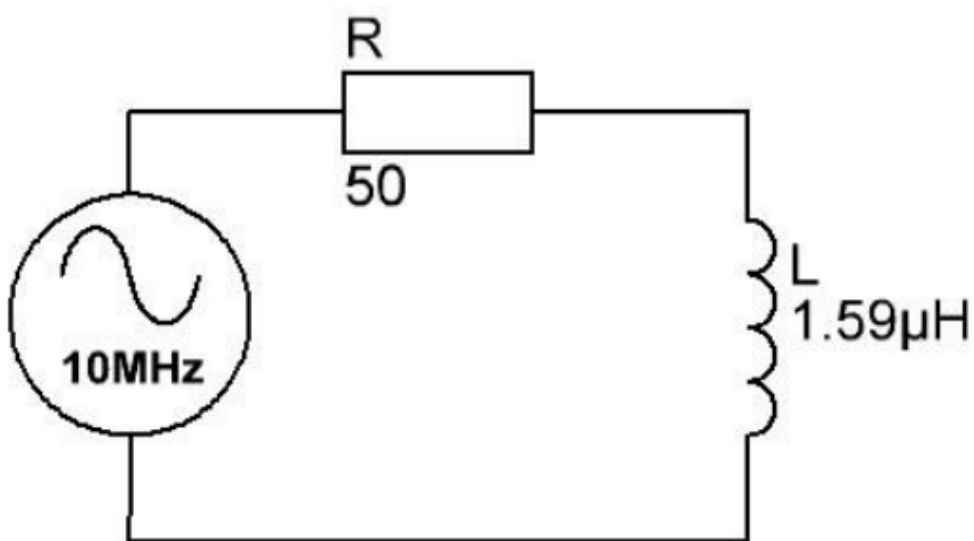
How are inductors used in this diagram?



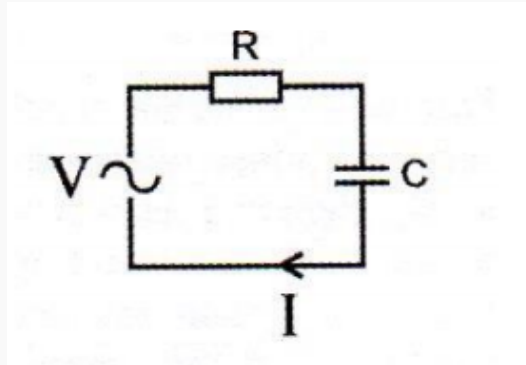
How is Impedance calculated in an RC or RL circuit?

What is the visual representation of Impedance calculated in an RC or RL circuit?

What is the impedance of the circuit in the diagram?



What is the impedance of the circuit in the diagram?



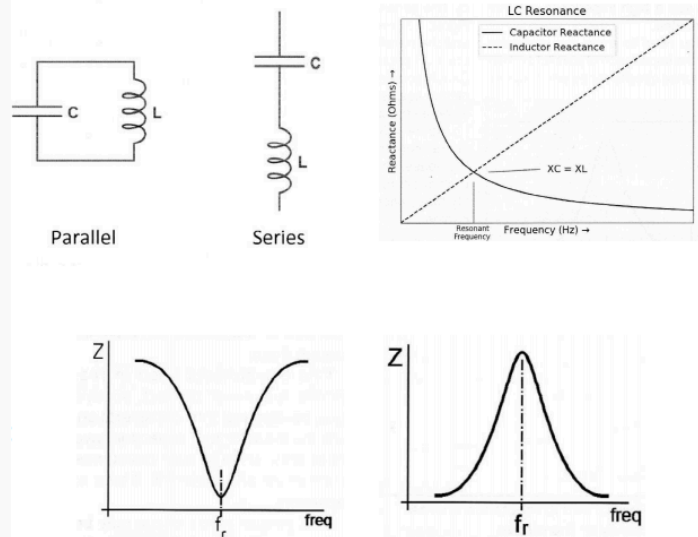
Really nasty question

**Really nasty question** gives you component values and supply voltage – what is  $V$  across  $C$

- Need to work out  $X$
- Use  $X$  and  $R$  to work out  $Z$
- Use  $Z$  to work out  $I$
- Use  $I$  and  $X$  to work out  $V$
- *Worked example in Weekly Instructions*

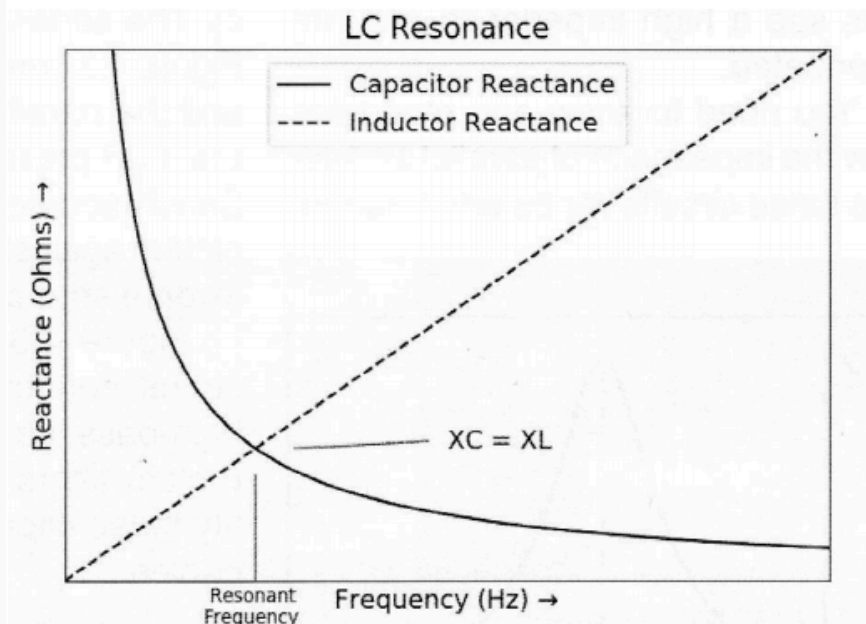
## 2h.1 • TECHNICAL ASPECTS • Tuned circuits & resonance • -cve6QhE

Recap on tuned circuits. What do you remember? Which is the acceptor circuit, and which is the rejector circuit? I always remember PARALLEL for PEAK Z.



## 2h.1 • TECHNICAL ASPECTS • Tuned circuits & resonance • 80kswhTQ

What is the resonant frequency formula that applies to both series and parallel tuned circuits?



How do you transpose the resonant frequency formula to solve for C or L?

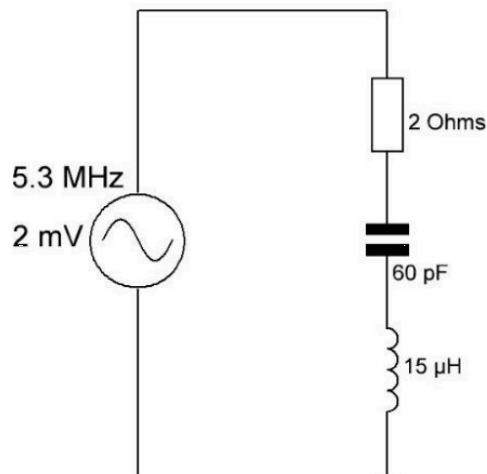
Calculate resonant frequency of 22pf capacitor with  $10\mu H$  inductor

Summarise what you know about crystals and how they're used.

Identify a circuit with crystals in it

What does the specification of a crystal's performance look like?

In this circuit the resonant frequency is 5.3MHz and there is an RF supply of just 2mV across the series circuit. Q MAGNIFICATION hinges on the fact that when a series tuned circuit is at resonance, the reactances  $X_L$  and  $X_C$  are equal and opposite, so they cancel each other.





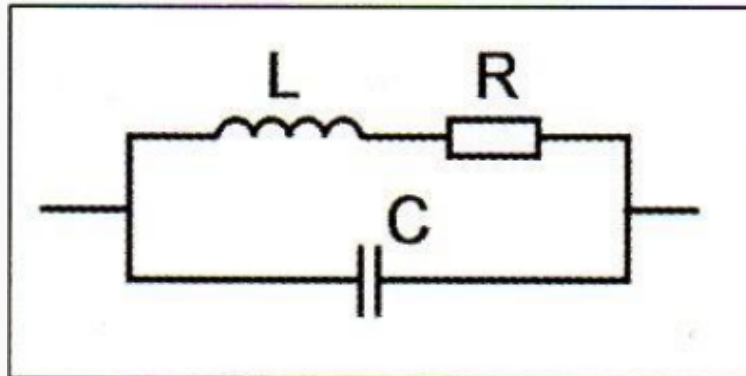
voltages and circulating currents in tuned circuits can be very high...

Apply the formula for Q factor given circuit component values...

Recall the definition of the half power point of resonance curves...

Apply the equation for Q given the resonant frequency and the half power points on the resonance curve...

Understand the meaning of dynamic resistance,  $R_D$ ...



What is working split?

What does the Licence say about testing your radio equipment?

Which band plans do you need to be familiar with for the Full exam?

Are you familiar with the 5MHz (60m) band plan?

Are you familiar with the 5MHz (60m) notes to the band plan?

Are you familiar with the 472kHz (600m) band plan?

Are you familiar with the 472kHz (600m) notes to the band plan?

Are you familiar with the 472kHz (600m) notes to the band plan?

Are you familiar with part one of the notes to the band plans?

**Notes to the bandplans**

Are you familiar with part two of the notes to the band plans?

**Notes to the bandplans**