ECE 510 RFIC Design Basic Knowledge Template

The 6 topics below are typical of what I would ask in a technical interview to explore basic knowledge of Radio Frequency Integrated Circuits.

Draw a schematic of a basic RFIC including at least one transistor, resistor, capacitor, and inductor that you could simulate in LTSpice, showing typical values that you would use in an RFIC process. Include bond wire inductance.

Sketch an approximate die layout for the circuit in the schematic above, showing bond pads and dimensions for the resistors, capacitors, inductors, and transistors.

Sketch a cross section of a device as it would be fabricated on a GaAs die, and discuss how it works using basic physics. The device could be a transistor, capacitor, inductor, transformer, etc. Include dimensions.

Use a sketch to show how an RFIC is bonded to a working circuit. Include some off-chip surface mount components in your sketch, and point out some differences between building a circuit using a bare RFIC die and a plastic packaged component.

Describe some measurements you would make on a new RFIC (for example the one in your schematic) to evaluate it's performance. Discuss how would you make the measurements, what equipment you would need, etc.

Describe how to use the measurements discussed above to modify a basic model for a new circuit. Give an example showing how some part of a measured performance curve relates to a resistor or capacitor etc. in your model.