1 CURRENT PLACEHOLDER, SOME SUMMARY HAS EMOJI PLEASE HELP REMOVING THEM

Category	# Questions	Description	Typical Questions
Side Questions (Conceptual Theory)	13	Key oral theory concepts: phase center, grating lobes, mutual coupling, miniaturization, and CEM methods.	- What is the phase center? - What are grating lobes? - What's the Wheeler-Chu limit? - What's the difference between DE and IE methods? - Why is miniaturizing antennas difficult? - What is mutual coupling?
Antenna Fundamentals (λ, f, Friis, Gain)	6	Core topics: frequency-wavelength, Friis, gain, effective area.	- What is the wavelength at 3GHz? - Derive and explain the Friis equation. - How can Pr > Pt be explained? - Can aperture efficiency exceed 1?
Scattering & Electromagnetic Theory	5	Modeling materials in EM fields, relation of scattered and total fields.	- What happens when a scatterer is a PEC or dielectric? - Solve E_tot = E_inc + E_scat. - Describe the role of induced currents.
Slot and Microstrip Antennas	5	Radiation from slots, patch resonance, equivalence use.	- Explain how a microstrip antenna works. - What resonates and in which direction? - Use equivalence theorem to analyze a slot.
Dipole and PEC Image Problems	4	Image theory and PECs affecting dipole fields.	- Draw the image of a dipole over PEC. - What is the far field of a dipole near PEC? - What height gives optimal directivity?
Far Field Radiation & Antenna Patterns	4	Calculate radiated E and H fields from simple sources.	- Use elementary dipole formulas to find far field. - What is the pattern in the phi = $\pi/2$ plane? - Derive F(r) for a radiating dipole.

Category	# Questions	Description	Typical Questions
Nulls and Directivity	4	Placing nulls, shaping beam with geometry and phase.	- Find smallest h to get a null at θ = 60°. - How can antenna placement create nulls? - Optimize h for main lobe targeting.
Equivalence Theorems & Boundary Conditions	3	Use of surface equivalence and physical meaning of boundary conditions.	- What does the equivalence theorem state? - Explain surface currents at PEC. - Why must E and H fields be continuous?
Uniform Linear Array (ULA) Theory	2	Element count vs pattern shaping, gain, and aperture.	- What happens to main lobe as $N \to \infty$? - How do grating lobes appear? - Prove scaling laws for gain and aperture.