

Chapter 1 : ECRF and Microwave Engineering Question Bank

ec rf and microwave engineering vii semester ece ec rf and microwave engineering question bank unit i- two port rf networks- circuit representation part a 1.

Must be capable of floating or being secured to a survival B. Must have its battery replaced after emergency use C. May be tested during the first five minutes of any hour D. All of these A PPI cathode-ray tube as used on a radar set A. Is used to check the percentage of modulation B. Indicates both the range and azimuth of a target C. Indicates only the range of a target D. Is used for receiver alignment The resonant frequency of a cavity resonator depends upon A. The mode of operation B. Its electrical dimensions C. Its physical dimensions D. The capacitor which tunes it The maximum usable range of the usual radar set on any particular range setting is determined by A. The width of the transmitted pulses B. The interval between transmitted pulses C. The bandwidth of the receiver IF stages D. The duty cycle A reflex klystron is oscillating at the frequency of its resonant cavity. If the reflector voltage is made slightly less negative, the A. Oscillation will cease B. Output power would increase C. The frequency will decrease D. Bunching would occur earlier in time The coarse frequency adjustment of a reflex klystron is accomplished by A. The AFC system B. Adjusting the flexible wall of the resonant cavity C. An adjustment in the synchronizer D. Varying the repeller voltage In a pulsed radar set, the STC circuit is used to A. Improve the target bearing resolution B. Increases receiver sensitivity for echoes from targets C. Vary the pulse frequency in order to control the maximum target D. Reduce interference from the effects of sea return In a pulsed radar set, the function of the duplexer is to A. Aid in calibrating the display unit B. Prevent frequency drift in the klystron C. Allow the transmitter and the receiver to operate from a common antenna D. A magnetron is operated at a duty cycle of 0. It has a peak power output of kilowatts. Its average power is A.

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What do you mean by slotted line? Slotted line is a fundamental tool for microwave measurements. Slotted line consists of a section of waveguide or co-axial line with a longitudinal slot. This slot is roughly 1 mm wide and allows an electric field probe to enter the waveguide for measurement of the relative magnitude of field at the location of the probe. The ratio of electric field strength of reflected and incident wave is called reflection co-efficient. What is voltage standing wave ratio? Voltage standing wave ratio is defined as the ratio of maximum voltage to the minimum voltage. The return loss is a measure of the power reflected by a line or network or device. Mention the drawback in return loss measurements. The instability of the signal source causes a change of signal power level during the measurement of input and reflected signal levels at different instants of time. Non-ideal directional couplers and detectors are also cause error. Power is defined as the quantity of energy dissipated or stored per unit time. What are the methods to detect microwave power? It is a power sensor whose resistance change with changed temperature as it absorb the microwave power. It is a short thin metallic wire sensor with positive temperature coefficient of resistance. It is convenient device setup for measuring the high power at microwave which involves conversion of microwave energy in to heat, absorbing the heat in a fluid and determine the temp. Mention the sensors used for microwave power measurements. The sensors used for microwave power measurements are the Schottky barrier diode, Bolometer and the Thermocouples whose resistance changes with the applied power. What is a VSWR meter? VSWR meter is a highly sensitive, high gain, high theta, low noise voltage amplifier tuned normally at fixed frequency of 1KHZ of which microwave signals modulated. This meter indicates calibrated VSWR reading for any loads. What is calorimetric direct heating method? In the calorimetric direct heating method, the rate of production of heat can be measured by observing the rise in the temperature of the dissipating medium. In the calorimetric indirect heating method, heat is transferred to another medium before measurement. List the different types of Impedance measurement methods? Slotted line method 2. What do you meant by reflection loss? The reflection loss is a measure of power loss during transmission due to the reflection of the signal as a result of impedance mismatch. The insertion loss is a measure of the loss of energy in transmission through a line or device compared to direct delivery of energy without the line or device. What are the contributions of insertion loss? The insertion loss is contributed by 1. Mismatch loss at the input 2. Attenuation loss through the device. Mismatch loss at the output How do you measure microwave frequency? What is a wave meter? It is a device used for frequency measurement in microwave. It has cylindrical cavity with a variable short circuit termination. It changes the resonant frequency of cavity by changing cavity length. Scattering parameters are defined as the ratio of the outgoing waves to the incident waves. The incident and reflected amplitudes of microwaves at any port are used to characterize a microwave circuit. It is defined by the ratio of permittivity of medium to permittivity of free space. What do you meant by isolation? The isolation between E and H arms are defined as the ratio of the power supplied by the generator connected to the E-arm port 4 to the power detected at H-arm port 3 when side arms 1 and 2 are terminated in matched load. List the methods for measuring dielectric constants? What are classifications of power measurements? The classifications of power measurements are 1. Low power less than 10 mW 2. Medium power from 10 mW to 10 W and 3. Distinguish between low frequency measurements and microwave measurements. Low frequency measurements At low frequency it is convenient to measure voltage and current and use them to calculate power. At microwave frequencies the amplitudes of the voltages and current on a transmission line are the functions of a distance and are not easily measurable. At low frequency, circuits use lumped elements. At microwave frequencies, the circuit elements are distributed.

Chapter 3 : Microwave Engineering Notes Questions and Answers part 2 | Legend Techz

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Specify the X-band frequency range and wavelength. Define Q- Factor 6. Define " Skin Effect 7. Define- Straight wire Inductance 8. State the different types of high frequency inductors. State the different types of high frequency resistors. State the different types of high frequency capacitors. Why are S parameters used in microwaves? Define- Scattering Matrix Define " Return Loss What is the zero property of S- matrix? What is meant by symmetry of scattering matrix? What is wave guide? Define " Lossless Network Define " Straight wire Inductance Which one is called junction? Write the unitary property for a lossless junction. State the principal advantage of microwave frequencies over lower frequency. List the applications of waveguide twist. What are the basic types of directional couplers? Express power input and power output under matched conditions for a two port network in terms of wave components. Name the properties of S-parameters. Mention the purposes of resistors. Name the types of resistors. Write the applications of Inductors. Mention the many forms of wire. Write about the skin effect in a wire. Give short note on straight-wire inductance in wire. Define transducer power gain. What are the parameters used to evaluate the performance of an amplifier? Prove the symmetry property of [s] in a reciprocal network. Discuss about unitary property for a lossless junction 3. Explain the S-matrix representation of multi port network. Explain in detail about low frequency parameters. How microwave junction can be described by scattering matrix. Derive the scattering matrix relation between input and output of a nxn junction. Explain the symmetry property in reciprocal network. Write in detail about resistors and its types. Give the [ABCD] matrix for a two-port network and derive its [s] matrix. What is meant by power gain of an amplifier? Define " Unconditional Stability 3. Define " Unilateral Power Gain 4. Define " Available Power Gain 5. Define " Noise figure 7. What are the considerations in selecting a matching network? State the various types of waveguide Stub? Define " Positive RF feedback Name the types of Magnetron. Define " Transit time Why impedance matching is required? What are the other constraints required? Define Power gain of an amplifier in terms of S- parameters and reflection coefficients. Draw typical output stability circle and input stability circle. What are the major bands available in microwave frequencies? Describe IEEE microwave frequency bands. Write the applications of microwaves. Enumerate the basic advantages of microwaves. What is H-plane tee? What is E- plane Tee? What is sum arm? Name some uses of waveguide- tees. Define " Tee Junction Why bends are used? Define " Gradual twists Give a note on directional couplers What do you meant by isolation? Define " directivity of directional coupler Write the characteristics of a three- port Tee- Junction. Discuss the various aspects of amplifier " power relations for RF transistor amplifier design. Explain stability considerations for RF transistor amplifier design. Explain various stabilization methods. Discuss gain considerations for RF amplifier. A microwave amplifier is characterized by its S- parameters. Derive equations for power gain for a transistor amplifier. What is matching network? Why is it required? Derive the transducer power gain for a transistor amplifier. Discuss about the design of T- section and Pi- section and matching networks. What are scattering coefficients? Why is magic tee referred as E- H tee? What is meant by directivity of directional coupler? What are the basic types of directional coupler? Define " Isolator 8. Define " coupling factor 9. Define " Non-reciprocal Devices State the properties of ferrites. Give the significance of Rat- Race junctions. How a Faraday rotation isolator can be constructed by using ferrite rod? Define " guide wavelength State the need for circulator in microwave applications. A directional coupler is having coupling factor of 20 dB and directivity of 40 dB. If the incident power is mW, what is the coupled power? What is the voltage Standing Wave Ratio? Write the properties of ferrites. Write the types of ferrite devices. Define " four port circulator Write the applications of circulators. Name some uses of isolators. Derive the [S] matrix for 3 port circulator.

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