**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR**
**(AUTONOMOUS)**
**Siddharth Nagar, Narayanavanam Road – 517583**
**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code:** AWP (20EC0421) **Course & Branch:** B.Tech & ECE

**Year &Sem:** III-B.Tech & II-Sem **Regulation:** R20

## UNIT-I
## ANTENNA & RADIATION PARAMETERS

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|---|---|---|---|
| 1. | Explain the radiation pattern of an antenna and its types with neat sketch. | [L2][CO1] | **[12M]** |
| 2. | Explain the following:<br>i). Radiation Intensity ii). Antenna Gain iii). Directivity | [L2][CO1] | **[12M]** |
| 3. | a). Write short notes on effective aperture. | [L1][CO1] | **[6M]** |
| | b). Define the following terms.<br>i). Radiation Resistance ii). Bandwidth iii). Beam Efficiency | [L1][CO1] | **[6M]** |
| 4. | A dipole having a length of 3 cm is operated at 1 GHz. The efficiency factor K=0.6. Calculate the radiation resistance, antenna gain and effective aperture. | [L3][CO1] | **[12M]** |
| 5. | Describe the following with suitable equations.<br>i). Antenna Matching.<br>ii). Antenna Noise Temperature | [L2][CO1] | **[12M]** |
| 6. | Discuss the concepts of radiation from the oscillating dipole. | [L2][CO2] | **[12M]** |
| 7. | Deduce the expression for radiation Parameters of a Half wave Dipole Antenna. | [L3][CO3] | **[12M]** |
| 8. | (a). What is meant by Front to back ratio? | [L3][CO1] | **[4M]** |
| | (b). An antenna receives a maximum power of 2μW from a radio station. Calculate the maximum effective area if the antenna is located in the far field station where E=50mV/m. | [L3][CO1] | **[8M]** |
| 9. | An antenna has a radiation resistance of 72Ω, and a loss resistance is 8Ω if the power gain of 16. Calculate the directivity of the antenna and the length of half wave dipole at 30MHz. | [L4][CO1] | **[12M]** |
| 10. | Derive the expression for radiation Parameters of a Quarter wave monopole antenna. | [L3][CO3] | **[12M]** |

## UNIT –II
## VHF, UHF AND MICROWAVE ANTENNAS – I

| | | | |
|---|---|---|---|
| 1. | a). Discuss the folded dipole antenna and its input impedance. | [L2][CO4] | **[6M]** |
| | b). What are parasitic elements & where they are used? | [L1][CO4] | **[6M]** |
| 2. | Explain about construction and operation of Yagi-Uda antenna with neat sketch. | [L2][CO4] | **[12M]** |
| 3. | a). List the advantages, disadvantages and applications of Yagi-Uda antenna. | [L1][CO4] | **[6M]** |
| | b). Design Yagi-Uda antenna of six elements to provide a gain of 12dB if the operating frequency is 200 MHz. | [L5][CO4] | **[6M]** |
| 4. | a). Explain about the construction and operation of helical antenna. | [L2][CO2] | **[8M]** |
| | b). List the applications of Helical Antenna. | [L1][CO2] | **[4M]** |
| 5. | a). Discuss about the helical antenna of normal mode and its radiation pattern. | [L2][CO2] | **[6M]** |
| | b). Discuss about the helical antenna of axial mode and its radiation pattern. | [L2][CO2] | **[6M]** |
| 6. | a). Define the following terms of Helical Antenna.<br>i). Pitch Angle ii). Axial Ratio | [L1][CO2] | **[6M]** |
| | b). Calculate the directivity of 20 turn helix with $\alpha = 12^0$ and circumference equals to one wavelength. | [L3][CO2] | **[6M]** |
| 7. | Discuss about the horn antenna types & its characteristics. | [L2][CO2] | **[12M]** |
| 8. | a). Discuss the design considerations of pyramidal horn antenna. | [L2][CO2] | **[6M]** |
| | b). Calculate the directivity of pyramidal horn antenna with an aperture. If size 12x12cm operating with 3.2cm wavelength. | [L3][CO2] | **[6M]** |
| 9. | a). Derive input impedance for three-wire Folded Dipole antenna. | [L3][CO2] | **[6M]** |
| | b). Discuss about calculations of Yagi- Uda Array elements. | [L2][CO4] | **[6M]** |
| 10. | Write a short notes on the following:<br>i). Helical Antenna ii). Horn antenna | [L1][CO2] | **[12M]** |

## UNIT –III
## VHF, UHF AND MICROWAVE ANTENNAS – II & ANTENNA MEASUREMENTS

| | | | |
|---|---|---|---|
| 1 | a). Explain about micro strip antennas and its types with neatdiagrams. | [L2][CO2] | **[6M]** |
| | b). Give the advantages and limitations of micro strip antennas. | [L1][CO2] | **[6M]** |
| 2 | a). Discuss the construction of rectangular patch antenna. | [L2][CO2] | **[8M]** |
| | b). What are the applications of microstrip antenna? | [L1][CO2] | **[4M]** |
| 3 | Discuss the characteristics of Microstrip Antenna. | [L1][CO2] | **[12M]** |
| 4 | a). Explain the types of reflector antennas. | [L2][CO2] | **[6M]** |
| | b). Draw and explain the principle of parabolic reflector. | [L2][CO2] | **[6M]** |
| 5 | a). Explain the different feed methods to parabolic reflectors. | [L2][CO2] | **[8M]** |
| | b). A parabolic dish provides a power gain of 50 dB at 10 GHz with70% efficiency. Find out i) HPBW ii) BWFN | [L3][CO2] | **[4M]** |
| 6 | a). Explain Cassegrain Feed system and give its advantages | [L2][CO2] | **[6M]** |
| | b). Explain about the reciprocity with respect to antenna measurements. | [L5][CO5] | **[6M]** |
| 7 | a). Write short notes on coordination system for antenna measurement. | [L1][CO5] | **[6M]** |
| | b). Explain near and far fields with respect to antenna measurements. | [L5][CO5] | **[6M]** |
| 8 | Explain the radiation pattern measurement with fundamental procedure, arrangements and distance requirement. | [L2][CO5] | **[12M]** |
| 9 | a). Explain sources of Error in Antenna measurement. | [L2][CO5] | **[6M]** |
| | b). Explain the measurement of directivity. | [L5][CO5] | **[6M]** |
| 10 | a). Explain Gain measurement by direct comparison method. | [L5][CO5] | **[6M]** |
| | b). Explain the gain measurement using absolute method. | [L5][CO5] | **[6M]** |

## UNIT –IV
## ANTENNA ARRAYS

| | | | |
|---|---|---|---|
| 1. | a). What is antenna array and explain its types? | [L2][CO4] | **[8M]** |
| | b). Define the point sources. | [L1][CO4] | **[4M]** |
| 2. | a). Write brief note on pattern and its types. | [L1][CO4] | **[8M]** |
| | b). What are the different cases of arrays of two-point sources? | [L1][CO4] | **[4M]** |
| 3. | Derive the expression for far field pattern of an array of two isotropic point sources at equal amplitude & same phase. | [L4][CO4] | **[12M]** |
| 4. | Derive the expression for far field pattern of an array of two isotropic point sources at equal amplitude & opposite phase. | [L4][CO4] | **[12M]** |
| 5. | a). Explain pattern multiplication with any one case. | [L3][CO4] | **[8M]** |
| | b). Find the minimum spacing between the elements in a broadsidearray of 10 isotropic radiators to have directivity of 7db. | [L2][CO4] | **[4M]** |
| 6. | a). Explain n- element uniform linear array | [L5][CO4] | **[6M]** |
| | b). A broad side array operating at 10cm wavelength consists of 4 half wave dipole spaced 50 cm each element carries radio frequencycurrent in the same phase and magnitude 0.25A. Calculate the radiated power, half power beamwidth of major lobe. | [L5][CO4] | **[6M]** |
| 7. | Explain End fire array with increase directivity and derive the directivity equation. | [L2][CO4] | **[12M]** |
| 8. | a). What is Broad side array and its radiation pattern. | [L2][CO4] | **[4M]** |
| | b). Deduce the characteristics of n-elements Broad side array. | [L3][CO4] | **[8M]** |
| 9. | a). What is End fire array and its radiation pattern. | [L2][CO4] | **[4M]** |
| | b). Deduce the characteristics of n-elements End fire array. | [L3][CO4] | **[8M]** |
| 10. | a). Compare the Broad side array and End fire array. | [L5][CO4] | **[6M]** |
| | b). Explain about the Binomial array. | [L2][CO4] | **[6M]** |

## UNIT –V
## WAVE PROPAGATION

| | | | |
|---|---|---|---|
| 1. | a). Explain different modes of Wave Propagation. | [L2][CO6] | **[6M]** |
| | b). Explain about refraction and reflection of EM waves. | [L2][CO6] | **[6M]** |
| 2. | Explain the Structure of Ground wave propagation with neat sketch. | [L2][CO6] | **[12M]** |
| 3. | Draw and explain the structure of Ionosphere with its typical electron density variation characteristics. | [L3][CO6] | **[12M]** |
| 4. | Explain Reflection and Refraction of sky waves by ionosphere. | [L2][CO6] | **[12M]** |
| 5. | a). Discuss about Ray path with neat sketch. | [L2][CO6] | **[6M]** |
| | b). Explain critical frequency and its expression. | [L2][CO6] | **[6M]** |
| 6. | a). Explain Maximum usable frequency with its expression. | [L2][CO6] | **[6M]** |
| | b). Determine the maximum usable frequency for a critical frequency of 20 MHz and an angle of incidence of 350. | [L2][CO6] | **[6M]** |
| 7. | a). Explain lowest usable high frequency (LUHF) and give its significance. | [L2][CO6] | **[6M]** |
| | b). Explain optimum working frequency and its significance. | [L2][CO6] | **[6M]** |
| 8. | a). Explain Virtual height and its significance. | [L2][CO6] | **[6M]** |
| | b), Explain Skip distance and derive its expression. | [L2][CO6] | **[6M]** |
| 9. | a). Explain the relation between MUF and skip distance. | [L2][CO6] | **[6M]** |
| | b). Explain Multi hop propagation. | [L2][CO6] | **[6M]** |
| 10. | a). Explain the energy loss in Ionosphere. | [L2][CO6] | **[6M]** |
| | b). For a flat earth assume that at 400 km reflection takes place. The maximum density of ionosphere corresponds to a refractive index of 0.9 at 10 MHz. Calculate range for which maximum usable frequencyis 10 MHz. | [L4][CO6] | **[6M]** |

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