COURSE CODE: 19EC0414 **R19**

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QUESTION BANK (DESCRIPTIVE)

Subject with Code : AWP(19EC0414) **Course & Branch**: B.Tech. - ECE

Year & Sem: III-B.Tech. & I-Sem. **Regulation:** R19

UNIT –I
ANTENNA & RADIATION PARAMETERS

1	(a) Explain Radiation Intensity and Antenna Gain. (b) Write short notes on Radiation Pattern and Beam Efficiency.	[L1][CO1] [L1][CO1]	**[6M]** **[6M]**
2	Explain the following (a) Antenna Directivity and Effective aperture of an Antenna. (b) Antenna Noise Temperature and Radiation Resistance.	[L2][CO1] [L2][CO1]	**[6M]** **[6M]**
3	Explain the following with suitable equations. (a) Antenna Matching. (b) Antenna Beam Efficiency	[L1][CO1] [L1][CO1]	**[6M]** **[6M]**
4	Develop the expression for Electric and Magnetic Field radiated by Half Wave Dipole Antenna $(\frac{\lambda}{2})$ and Sketch its Field Strength pattern.	[L3][CO1]	**[12M]**
5	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]**
6	Derive expression for Electric and Magnetic Field radiated by Quarter Wave Monopole $(\frac{\lambda}{4})$ and Sketch its Field Strength pattern.	[L3][CO1]	**[12M]**
7	Explain the concepts of radiation from the oscillating dipole.	[L2][CO1]	**[12M]**
8	(a) Calculate radiation resistance of a dipole antenna of length λ/8 m. (b) Define Effective Aperture and give its expression?	[L2][CO1] [L2][CO1]	**[4M]** **[8M]**
9	(a)An antenna has a radiation resistance is 72Ω and a loss resistance is 8Ω if the power gain is 16. Calculate the directivity of the antenna. (b) Determine the length of half wave dipole at 30MHz.	[L2][CO1] [L2][CO1]	**[8M]** **[4M]**
10	(a) What is meant by Front to back ratio? (b) Define Radiation Resistance of an antenna. (c) Derive the expression for antenna efficiency. (c) What are the different types of apertures?	[L1][CO1] [L1][CO1] [L3][CO1] [L1][CO1]	**[3M]** **[3M]** **[3M]** **[3M]**

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UNIT –II
VHF, UHF AND MICROWAVE ANTENNAS – I

1	(a) Discuss about the Folded dipole antenna and its input impedance. (b) What are parasitic elements & where they are used?	[L2][CO4] [L1][CO4]	**[6M]** **[6M]**
2	(a) Explain about construction and operation of Yagi-Uda antenna with neat sketch. (b) Explain about the construction and operation of helical antenna.	[L2][CO4] [L2][CO4]	**[6M]** **[6M]**
3	(a) Discuss about the helical antenna geometry, axial mode of radiation and its applications. (b) Discuss about the helical antenna geometry, Normal mode of radiation and its applications.	[L2][CO3] [L2][CO4]	**[6M]** **[6M]**
4	(a) Discuss about the horn antenna types & its characteristics. (b) Discuss the design considerations of pyramidal horn antenna.	[L2][CO4] [L2][CO4]	**[6M]** **[6M]**
5	(a) Discuss the types of horn antennas. (b) Write short notes on i) Folded dipole antenna ii) Yagi-Uda array	[L2][CO4] [L1][CO4]	**[6M]** **[6M]**
6	(a) Calculate the directivity of 20 turn helix with $\alpha = 12^0$and circumference equals to one wavelength. (b) Give the applications of helical antennas.	[L3][CO4] [L1][CO4]	**[6M]** **[6M]**
7	(a) Discuss advantages, disadvantages and applications of Yagi-Uda antenna (b)Calculate the directivity and half power beamwidth. For a 20-turns helical antenna operating at 3GHz with circumference of 10cm and spacing between the turns 0.3 wavelength is operating at 3GHz.	[L2][CO4] [L3][CO4]	**[6M]** **[6M]**
8	(a) Write short notes on Helical antenna and its Modes. (b) Calculate the directivity of pyramidal horn antenna with an aperture. If size 12x12cm operating with 3.2cm wavelength.	[L1][CO3] [L3][CO4]	**[6M]** **[6M]**
9	(a) Write short notes on Horn antenna. (b) Design Yagi-Uda antenna of six elements to provide a gain of 12dB if the operating frequency is 200 MHz.	[L1][CO4] [L6][CO4]	**[5M]** **[7M]**
10	(a) Draw and explain the three elements of Yagi-Uda array (b) Define Normal mode and axial mode in helical antenna? (c) Define Pitch angle. (d) Define axial ratio.	[L2][CO4] [L1][CO3] [L1][CO3] [L1][CO3]	**[3M]** **[3M]** **[3M]** **[3M]**

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UNIT – III

VHF, UHF AND MICROWAVE ANTENNAS – II & ANTENNA MEASUREMENTS

1.	(a) Give the advantages and limitations of micro strip antennas. (b) Explain about micro strip antennas and its types with neat diagrams.	[L1][CO4] [L5][CO4]	**[6M]** **[6M]**
2.	(a) Write short notes on flat sheet & corner reflector. (b) What are the types of reflectors? Explain the features of parabolic reflectors.	[L1][CO3] [L1][CO3]	**[6M]** **[6M]**
3.	(a) Discuss the construction of rectangular patch antenna. (b) A parabolic reflector antenna with diameter 1.8 m is designed to operate at frequency of 6 GHz and illumination efficiency of 0.65. Calculate the FNBW and antenna gain	[L2][CO3] [L2][CO2]	**[6M]** **[6M]**
4.	(a) Draw and explain the principle of parabolic reflector. (b) A parabolic dish provides a power gain of 50 dB at 10 GHz with 70% efficiency. Find out i)HPBW ii) BWFN iii) Diameter	[L2][CO3] [L2][CO3]	 **[6M]** **[6M]**
5.	(a)Explain the effect between variation of focal length position and radiation in paraboloid. (b) Explain Cassegrain Feed system and give its advantages	[L2][CO3] [L2][CO3]	**[6M]** **[6M]**
6.	(a) Explain about the Reciprocity with respect to antenna measurements. (b) Explain near & far fields with respect to antenna measurements.	[L5][CO3] [L5][CO3]	 **[6M]** **[6M]**
7.	(a) Explain sources of Error in Antenna measurement. (b) Define Radiation pattern and explain the set up for measurement of Radiation pattern of an antenna	[L2][CO5] [L1][CO5]	 **[6M]** **[6M]**
8.	(a) Write short notes on Coordination system for antenna measurement. (b)Explain Gain measurement by direct comparison method.	[L1][CO3] [L5][CO3]	**[6M]** **[6M]**
9.	(a) Explain the gain measurement using absolute method. (b) Explain the measurement of directivity	[L5][CO5] [L5][CO5]	**[6M]** **[6M]**
10.	(a) What is a patch antenna? (b) What are the applications of Microstrip antenna? (c) What is reflector antenna and give its significance? (d) Mention different methods of feeds of parabolic reflector antennas.	[L1][CO4] [L1][CO4] [L1][CO3] [L1][CO3]	**[3M]** **[3M]** **[3M]** **[3M]**

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UNIT – IV
ANTENNA ARRAYS

1.	(a) What is antenna array? Define point sources and uniform linear array. (b) Write short notes on broad side and end fire arrays.	[L1][CO4] [L1][CO4]	**[6M]** **[6M]**
2.	(a) Explain n- element uniform linear array (b) Write short notes on collinear Array	[L5][CO4] [L1][CO4]	**[8M]** **[4M]**
3.	Derive the expression for far field pattern of an array of two isotropic point sources at equal amplitude& same phase.	[L4][CO3]	**[12M]**
4.	Explain End fire array with increase directivity and derive the directivity equation.	[L5][CO4]	**[12M]**
5.	Derive the expression for far field pattern of an array of two isotropic point sources at equal amplitude & opposite phase.	[L4][CO4]	**[12M]**
6.	(a)Explain pattern multiplication with appropriate examples. (b) A broad side array operating at 10cm wavelength consists of 4 half wave dipole spaced 50 cm each element carries radio frequency current in the same phase and magnitude 0.25A. Calculate the radiated power, half power beamwidth of major lobe.	[L3][CO4] [L5][CO4]	**[6M]** **[6M]**
7.	(a) Show that Directivity of BSA, L>>d is $D_0=2(d/\lambda)$. (b) Show that Directivity of EFA, L>>d is $D_0=4(d/\lambda)$.	[L5][CO4] [L5][CO4]	**[6M]** **[6M]**
8.	(a)What is principle of pattern multiplication? List the advantages and disadvantages. (b) Explain about the Binomial array.	[L1][CO4] [L2][CO4]	**[6M]** **[6M]**
9.	Compare the Broad side array and end fire array.	[L5][CO4]	**[12M]**
10.	(a) What are the different types of antenna arrays? (b) What are the different cases of arrays of two-point sources? (c) Find the minimum spacing between the elements in a broadside array of 10 isotropic radiators to a have directivity of 7db.	[L1][CO4] [L1][CO4] [L2][CO4]	**[4M]** **[4M]** **[4M]**

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UNIT – V
WAVE PROPAGATION

1.	(a) Explain different modes of Wave Propagation. (b) Explain about refraction and reflection of EM waves.	[L2][CO5] [L2][CO5]	**[6M]** **[6M]**
2.	Draw and explain the structure of Ionosphere with its typical electron density variation characteristics.	[L5][CO5]	**[12M]**
3.	Explain Reflection and Refraction of sky waves by ionosphere.	[L5][CO5]	**[12M]**
4.	Explain the Structure of Ground wave propagation with neat sketch.	[L5][CO5]	**[12M]**
5.	(a) Explain critical frequency and its expression. (b) Explain Maximum usable frequency with its expression.	[L5][CO5] [L5][CO5]	**[6M]** **[6M]**
6.	(a) Explain optimum working frequency and its significance. (b)Explain lowest usable high frequency (LUHF) and give its significance.	[L5][CO5] [L5][CO6]	**[6M]** **[6M]**
7.	(a) Explain Virtual height and its significance. (b) Explain Skip distance and derive its expression.	[L5][CO6] L5][CO6]	**[6M]** **[6M]**
8.	(a) Explain the relation between MUF and skip distance. (b) Explain Multi hop propagation.	[L5][CO6] [L5][CO6]	**[6M]** **[6M]**
9.	(a) Explain the energy loss in Ionosphere. (b) At a particular day time, the critical frequency observed in E and F layers are 2.5 MHz and 8.5 MHz respectively. Calculate the maximum electron density of both the layer sin cubic meter.	[L5][CO6] [L4][CO6]	**[6M]** **[6M]**
10	(a) 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 frequency is 10 MHz (b)Determine the maximum usable frequency for a critical frequency of 20 MHz and an angle of incidence of 35^0	[L4][CO6] [L4][CO6]	**[8M]** **[4M]**

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