**HOME ASSIGNMENT -1**

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Q.1 Find radiation resistance of a short dipole of effective length λ/10 . Also Sketch a radiation pattern an antenna which shows major lobe, side lobe and back lobe. Discuss beam width between first nulls and half power beam width.

Q.2 Find antenna temperature of an antenna which radiates its whole energy in a pencil beam with full beam efficiency at sky of 30K temperature. Also explain how a plane ground affects the radiation pattern and other parameters when a half wavelength antenna is installed horizontally over the ground

Q.3Find radiation intensity of an antenna radiating a1kW power over 2 square degree of beam. Also derive electric field of a loop antenna of radius r at a distance R with its directivity calculation.

Q.4 What is gain (dB) of two half wave dipole array when the two elements are fed in phase? Explain half wave length slot antenna with its complementary dipole with suitable figures, impedance relation and feed methods too.

Q.5 What is radiation resistance of 100 m long wire half wave dipole antenna working at 3MHz ? Deduce the relation between effective aperture and effective height of an antenna by assuming necessary parameters

Q.6 A horn antenna of 100 cm2 effective aperture is operated at 1GHz. Find the gain for the antenna .

Q.7 A helical antenna of 20 cm diameter and 50 turns with spacing of 0.5cm is operated at 600MHz .Find its half power beam width. Also differentiate the resonant and the non resonant long wire antennas in addition with their electric fields radiation patterns

Q.8 Write expression of active region bandwidth of log periodic antenna. Write a short note on it also .

Q.9 What is expression of roughness of earth surface for ground wave propagation?

Q.10What is critical frequency of maximum ionization of 1014/cc? Explain the atmosphere layers useful for communication.

Q11. What is solid angle if beam area is 15m2 at distance of 1000m from the transmitter located at center of enclosing sphere? By keeping the same beam area at a distance of 10km, How much change will there be in solid angle? Also write a technical short note on Horn antenna

Q12 If two aircrafts are flying at an altitude of 10km and 80km,respectively,What is the maximum distance along the surface of earth over which they can have effective point to point communication. Also write a technical short note on Microstrip patch antenna .

Q13. Calculate the electric field strength at a distance 50 km over the rocky land with conductivity of 10mS/m and εr =7 from 3MHz transmitter with a unit electric field strength of 2500mV /m. discuss about tropo-scattered communication and duct communication.

Q14 Find the Gain, bandwidth and capture area for a parabolic reflector with 5m diameter dish and dipole feed at 500 MHz. Also write a technical short note on Flate sheet and corner reflectors.

Q.15Describe working of parabolic reflector with different feed method ,bandwidth and directivity . Also write a technical short note on Effects of imperfect earth and curvature of earth.

Q.16Explain the modes of helical antenna in which it can be operated. Also write expression of its parameters in both modes. Also write a technical short note on space wave communication.

Q.17.Calculate the field strength of ground wave at a distance of 100 km from a transmitter antenna with power of 100 kW and receiver antenna radiates its 50% of transmitted power back in atmosphere. The field for direct ray is 2715mV/m at 1km .operating frequency is 500KHz. Given that εr =81and, σ =4.5x10-3mho/cm. Also write a technical short note on Wave characteristics of 3-30 MHz frequency range.

Q18. Derive the formula of refractive index for ionosphere ,critical frequency and MUF and define each of them. If maximum usable frequency is 5MHz, What will be optimum working frequency?

Q19.Deduce the field pattern expression of a two half wave dipole array in each plane with its driving point impedance and gain (dB) in field .

Q20. Draw radiation pattern of 4- isotropic elements array when the elements with separation of half wave length are fed in phase and out of phase with equal amplitudes . Deal them seperately

Q21.Derive the expression of electric field vector for short dipole antenna through finding the scalar potential. and magnetic field and seperate radiated ,induced and static parts of them.