Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B.Tech.

Branch	**: ECE**	**Semester**	**:6th**
Title of the Course	**:Antenna and wave propagation**	**Course Code**	**: EC352**

Time: 3 Hours **Maximum Marks: 50**

Note :

Guidelines:

The question paper divided into three sections A, B and C and each section have following type of questions

a. **Section A: Carry 5parts of 02 marks each and all parts are compulsory.**
b. **Section B: Contains Four (04) questions of 5 marks each.**
c. **Section C: Contains Two (02) questions of ten (10) marks each.**

Section A

1. Describe the importance of Antenna efficiency. And on what factors it's depend.

2. Explain radiation mechanism in antenna.

3. While designing yagi-uda for the practical applications such as TV receiver, the total length of directors is kept as $0.44*\lambda$.Why?

4. Find the free space loss for the communication at a distance of 120 km from a T_x operating at 2 Ghz. Also calculate the received power at the receiver if $P_t = 100$ Watt and gain of the T_x and R_x antennas are 20 dB and 15 dB respectively.

5. Find the total power radiated for radiation intensity $U= A_o\sin\theta$.

Section B

1. The normalized radiation intensity of an antenna is represented by $U(\theta)= \cos^2(\theta)\cos^2(3\theta)$, find the
   a. HPBW
   b. FNBW

2. A resonant half-wave dipole is made out of copper ($\sigma=5.7x\ 10^7$ S/m) wire. Determine the conduction-dielectric efficiency of the dipole antenna at f=100 MHz if the radius of the wire b is $3x10^{-4}\lambda$, and the radiation resistance of the $\lambda/2$ dipole is 73 ohm.

3. Explain the Helical antenna and their type with examples.

4. An antenna of gain 35 dB is to be tested at 10 GHz. The source antenna of gain 20 dB is placed 200maway from it. The receiver sensitivity is -100 dBm. Determine the minimum transmitted power that is needed for dynamic range of 50 dB.

Section C

1. Find the array factor, nulls and maxima conditions for 2 element uniform linear array

2. A 1 m long dipole antenna is driven by 150 MHz source having a source resistance of 50 Ohms and voltage of 50 Volts. If the ohmic resistance of antenna is given by R_L = 0.5 Ohms, find current going into the antenna, power dissipated by the antenna, power radiated by the antenna and radiation efficiency of the antenna.