

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2016****Subject Code:2161003****Date:09/05/2016****Subject Name: Antenna & Wave Propagation****Time: 10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define the following terms: **07**
(i) Beam solid angle
(ii) Directivity
(iii) Antenna Aperture
(iv) Radiation resistance
(b) Explain Hertzian Dipole. And Find the Radiation resistance of a Hertzian dipole of length $\lambda/40$, $\lambda/60$, $\lambda/80$. **07**
- Q.2** (a) (i) Derive the expression of Friss transmission formula. **07**
(ii) Discuss the Antenna field zones.
(b) Obtain the expressions of electric and magnetic fields of an Alternating current element. **07**
- OR**
- (b) Explain (i) The Principle of Pattern multiplication. **07**
(ii) Binomial arrays.
- Q.3** (a) State Babinet's principle and illustrate its application to slot antennas and complementary antennas. **07**
(b) Explain the Helical Geometry with proper Diagram. Also Calculate the directivity, HPBW and terminating resistance for a Helix operating in an axial mode with following dimensions:
No.of turns=8, Operating frequency=2GHz, Circumference= 0.6λ , Distance between turns= 0.2λ . **07**
- OR**
- Q.3** (a) Explain the working of Artificial dielectric lens Antenna and derive the expression for Effective refractive index of such a lens formed by conducting sphere. **07**
(b) Derive the expression of the Radiation resistance of Small loop antenna. **07**
- Q.4** (a) State the Rumsey's principle and discuss the current criteria for the antenna to be frequency independent. Enlist the different frequency independent antennas and applications of it. **07**
(b) Derive the expression for the field distribution across the aperture of the cylindrical parabolic reflector. **07**
- OR**
- Q.4** (a) Explain the following: **07**
(i) Gain measurement methods
(ii) Phase measurement methods
(b) Write a short note on Horn antenna. **07**

- Q.5** **(a)** Write a Short note on Microstrip Antenna. **07**
- (b)** Explain the following: **07**
- (i) Duct propagation
- (ii) Virtual height
- (iii) MUF
- (iv) Skip distance

OR

- Q.5** **(a)** Explain the Ultra wideband antenna(UWB) antenna for Digital application. **07**
- (b)** Explain the Different modes of Radio wave propagation. **07**
