

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (OLD) EXAMINATION – WINTER 2018****Subject Code:161003****Date: 16/11/2018****Subject Name: Antenna & Wave Propagation****Time: 02:30 PM TO 05:00 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)** Explain following antenna parameters: **07**  
i. Radiation resistance  
ii. Antenna efficiency  
iii. Directivity  
iv. Gain
- (b)** Illustrate following terms with respect to radio wave propagation: **07**  
i. Skip distance  
ii. Duct Propagation  
iii. Tropospheric Scattering
- Q.2 (a)** Derive the expression of Friss transmission formula for radio link. **07**  
**(b)** Explain the helical geometry with proper Diagram. List out various radiation modes of helical antenna. Also write necessary equations describing each mode. **07**
- OR**
- (b)** List out & explain different methods of antenna feeding. **07**
- Q.3 (a)** List out and explain various types of array antenna with suitable diagrams. **07**  
**(b)** Design & draw 3-element Yagi-Uda antenna. Justify the role of reflector and director. How gain of the antenna can be improved? Why should one use folded-dipole? **07**
- OR**
- Q.3 (a)** Explain following with respect to linear arrays: **07**  
i. Schelkunoff theorem  
ii. Discuss Dolph–Tchebysheff distribution
- (b)** Why smart antenna is called so? Explain in detail the concept of smart antenna with appropriate diagrams. **07**
- Q.4 (a)** List out various antennas for special applications. Explain any two in brief. **07**  
**(b)** List out various methods of antenna gain measurement. Describe any two in brief. **07**
- OR**
- Q.4 (a)** State and explain babinet's principle with necessary diagrams. **07**  
**(b)** Write a note on micro-strip antennas including salient features, shapes, pros & cons, and applications. **07**
- Q.5 (a)** Write a brief note on following: **07**  
i. Types of lens antenna  
ii. Types of slot antenna
- (b)** Illustrate following terms with respect to radio wave propagation: **07**  
i. Ground wave propagation  
ii. Space wave propagation

- Q.5** (a) Write a brief note on following: **07**
- i. Types of reflector antenna
  - ii. Types of horn antenna
- (b) Write a detailed note on role of ionosphere in sky wave propagation. **07**

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