

**B. Tech. Sem -VI (E & TC Engg.) (2014 COURSE) (CBCS) :**  
**WINTER - 2018**

**SUBJECT: MICROWAVE THEORY AND ANTENNAS**

Day: Friday  
Date: 16/11/2018

**W-2018-2515**

Time: 10.00 AM TO 01.00 PM  
Max. Marks: 60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to right indicate **FULL** marks.
- 3) Assume suitable data if necessary.
- 4) Smith Chart should be provided

**Q.1** Calculate the Voltage standing ratio for loss less line of characteristic impedance 50 Ohms when it is terminated in 100 Ohms and 30-j50 ohms. **(10)**

**OR**

Calculate the position and length of a short circuited stub designed to match a 200 ohm load to a transmission line whose characteristic impedance is 300 Ohms

**Q.2** Find the cut off wavelength in a standard rectangular waveguide for TE<sub>11</sub> mode. **(10)**

**OR**

Differentiate between TE and TM mode with necessary examples and equations.

**Q.3** Explain the following with respect to klystron: **(10)**  
a) Buncher cavity b) catcher cavity c) Velocity modulation d) Characteristics

**OR**

Explain the following with respect to Magic tree:  
a) E-Plane b) H-Plane c) S-matrix d) Applications

**Q.4** Calculate the maximum effective area of a microwave antenna which has directivity of 8.90 **(10)**

**OR**

Find the gain, bandwidth and capture area of a parabolic antenna with a 6 meters diameter dish and dipole feed at a frequency of 10 GHz.

**Q.5** Derive the pattern minima for an array of n isotropic point sources of equal amplitude, phase and spacing. **(10)**

**OR**

Explain the following with respect to log-periodic antenna:  
a) Scale factor b) active region c) Inactive region d) Spacing factor e) Apex angle

**Q.6** Explain the following with respect to Micro strip antenna: **(10)**  
a) Duality factor b) bandwidth c) Efficiency d) Feed matrix

**OR**

Determine the diameter of a parabolic reflector antenna required to produce a nulls beam width of 10° at 3GHz.