

B. TECH. SEM -VI (E & TC ENGG.) (2014 COURSE) (CBCS) :

SUMMER - 2018

SUBJECT: MICROWAVE THEORY & ANTENNAS

Day: **Friday**
Date: **08/06/2018**

S-2018-2460

Time: **02.30 PM TO 05.30 PM**
Max Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.
- 4) Use of non-programmable **CALCULATOR** is allowed.

SECTION-A

- Q.1** A transmission line operating at 500 MHz has $Z_0 = 80\Omega$, $\alpha = 0.04\text{Np/m}$, $\beta = 15$ rad/m. Find the line parameters R, L, G, & C. (10)
- OR**
- Q.2** A telephone line has $R = 30\ \Omega/\text{Km}$, $L = 100\text{mH}/\text{Km}$, $G = 0$ and $C = 20\ \mu\text{f}/\text{km}$ at $f = 1\text{KHz}$. Find a) Characteristic impedance b) Propagation constant c) Phase velocity (10)
- Q.3** Define the following with respect to waveguides. (10)
a) Dominant mode b) Cut off frequency c) Hybrid mode d) TM_{21}
e) TE_{32}
- OR**
- Q.4** Define the following with respect to waveguides. (10)
a) Group velocity b) Phase velocity c) TEM mode d) Circular waveguide
e) TM_{11}
- Q.5** Explain the concept of Wilkinson power divider with diagrams. (10)
- OR**
- Q.6** Differentiate between active and passive microwave devices with examples. (10)
- Q.7** Define the following parameters with respect to antenna. (10)
a) Beam width b) Antenna radiation efficiency c) Directivity d) Antenna temperature
- OR**
- Q.8** Derive the radar range equation? (10)
- Q.9** Explain the principle of pattern multiplication and find the array factor of a two element array. (10)
- OR**
- Q.10** A linear broadside array consists of four equal isotropic in phase point sources with $\lambda/3$ spacing. (length of the array λ) Calculate a) Directivity b) BWFN c) HPBW (10)
- Q.11** Explain the importance of Babinet's principle? (10)
- OR**
- Q.12** A parabolic antenna having gain of 10W at $\lambda = 10\text{um}$, find the diameter and HPBW of the antenna. (10)