

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VI E & TC :SUMMER- 2022
SUBJECT : MICROWAVE THEORY & ANTENNAS

Day : Tuesday
Date : 21-06-2022

S-13364-2022

Time : 02:30 PM-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.
- 5) Use **Smith chart**, if necessary.

Q.1 An ideal loss less quarter wave ($\lambda/4$) transmission line of characteristic impedance 50 ohms is terminated in a load impedance Z_L . Calculate source impedance for the following load impedance Z_L (10)
a) $Z_L = 0$ b) $Z_L = 50$ Ohms c) $Z_L = \infty$

OR

Q.1 An ideal loss less transmission line of characteristic impedance 500 ohms is terminated by a resistance of 200 ohms. Calculate the VSWR (10)

Q.2 How to excite TE & TM modes in rectangular waveguide? Explain with proper diagram (10)

OR

Q.2 Differentiate between TE and TM mode with proper equations and diagram. (10)

Q.3 Explain the following with respect to direction coupler : (10)
a) Directivity b) Coupling factor c) Insertion loss d) Isolation
Explain the following with respect to klystron amplifier :

OR

Q.3 a) Diagram b) Cavities c) Drift space d) velocity modulation e) Bunching process (10)

Q.4 In a microwave communication line two identical antennas operating at 10 GHz are used with power gain of 30 dB. If the transmit is 1 mW find the received power if the range is 30 Km. (10)

OR

Q.4 Define radiation pattern? Explain the following with suitable diagram: (10)
a) Major Lobe b) Minor lobe c) HPBW d) FNBW e) Back lobe

Q.5 Explain the following with respect to Log-periodic antenna (10)
a) Apex angle b) scale factor c) spacing factor d) Frequency ration

OR

Q.5 Draw the diagrams of the following: (10)
a) Small dipole b) finite length dipole c) half wavelength dipole d) Monopole

Q.6 Define Huygens's Principle? Explain with proper diagram and equations (10)

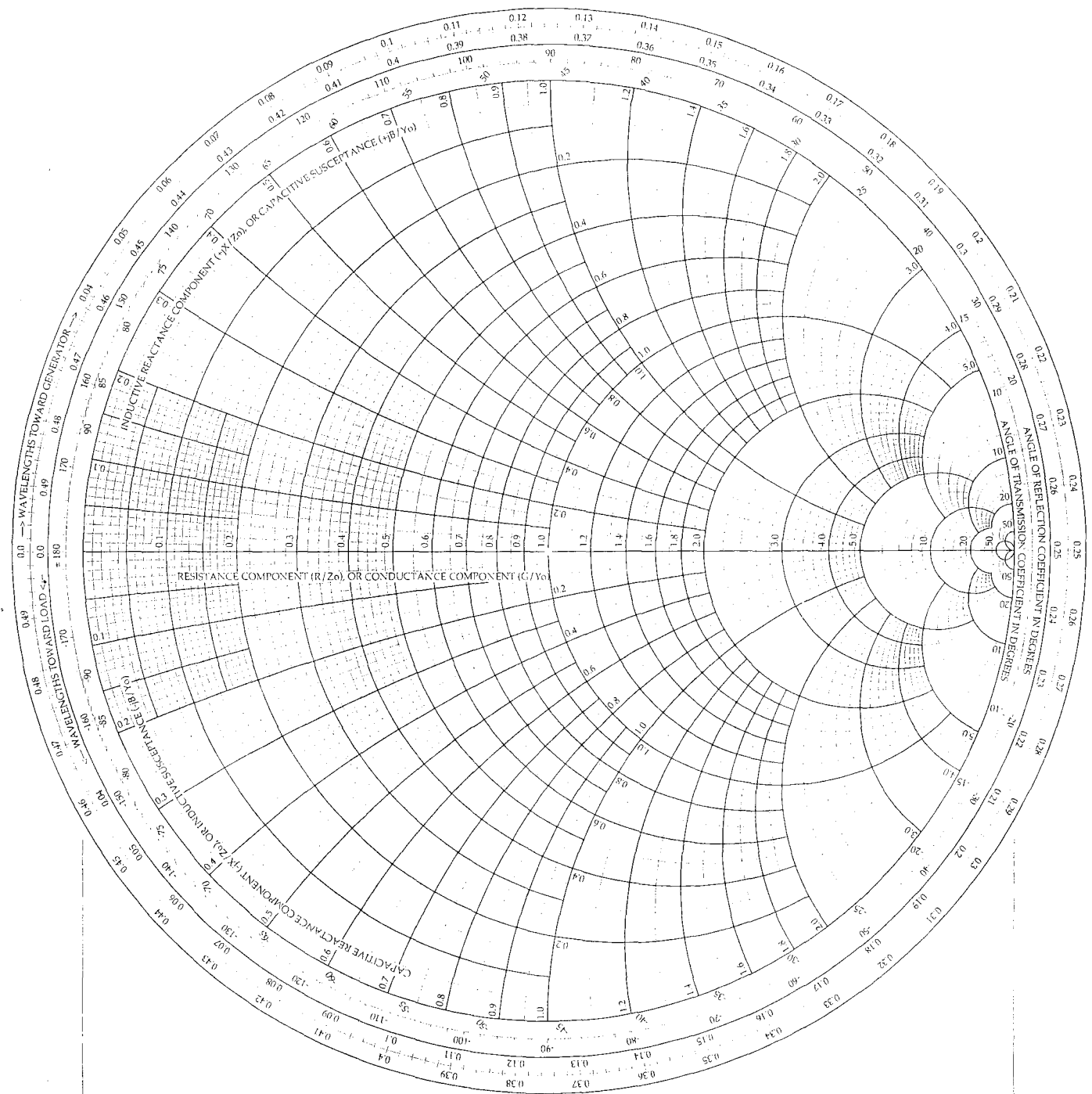
OR

Q.6 A Paraboloid reflector antenna with diameter 30 meters is designed to operate at frequency of 6 GHz and illumination efficiency of 0.54. Calculate the antenna gain in decibels. (10)

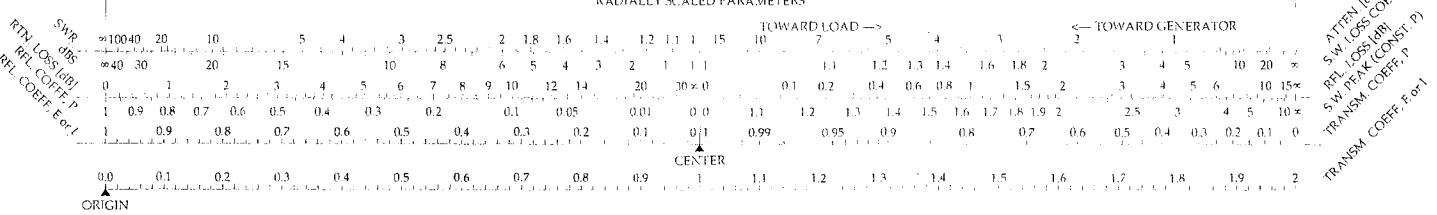
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The Complete Smith Chart

Black Magic Design



RADIALLY SCALED PARAMETERS



RTN. LOSS (dB)
 TRANSM. COEFF. (E or I)
 CENTER