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

Day : Tuesday

Time : 10:00 AM-01:00 PM

Date : 29-11-2022

W-13364-2022

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.
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Q.1 An ideal loss less transmission line of characteristic impedance 600 ohms is terminated by a resistance of 300 ohms .Calculate the VSWR (10)

OR

Q.1 A transmission line of characteristic impedance 600 ohms is terminated by a resistance of $j150$ ohms. Find the input impedance of a section 25 cm long at a frequency of 300 MHz (10)

Q.2 What is dominant mode in rectangular waveguide? (10)

OR

Q.2 Derive field equations of TE_{mn} mode in rectangular waveguide

Q.3 The input power in a two hole directional coupler is 2mW.The coupler has a coupling factor of 15 dB and directivity of 30 dB. Calculate the power in all the ports. (10)

OR

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

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

OR

Q.4 In a microwave communication line two identical antennas operating at 10 GHz are used with power gain of 40 dB If the transmit is 1 mW find the received power if the range is 30 Km. (10)

Q.5 For a linear array of n isotropic sources of equal amplitude and spacing. Derive the directions of pattern minima. (10)

OR

Q.5 How broad band antenna and fractal antenna are different from normal antennas (10)

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

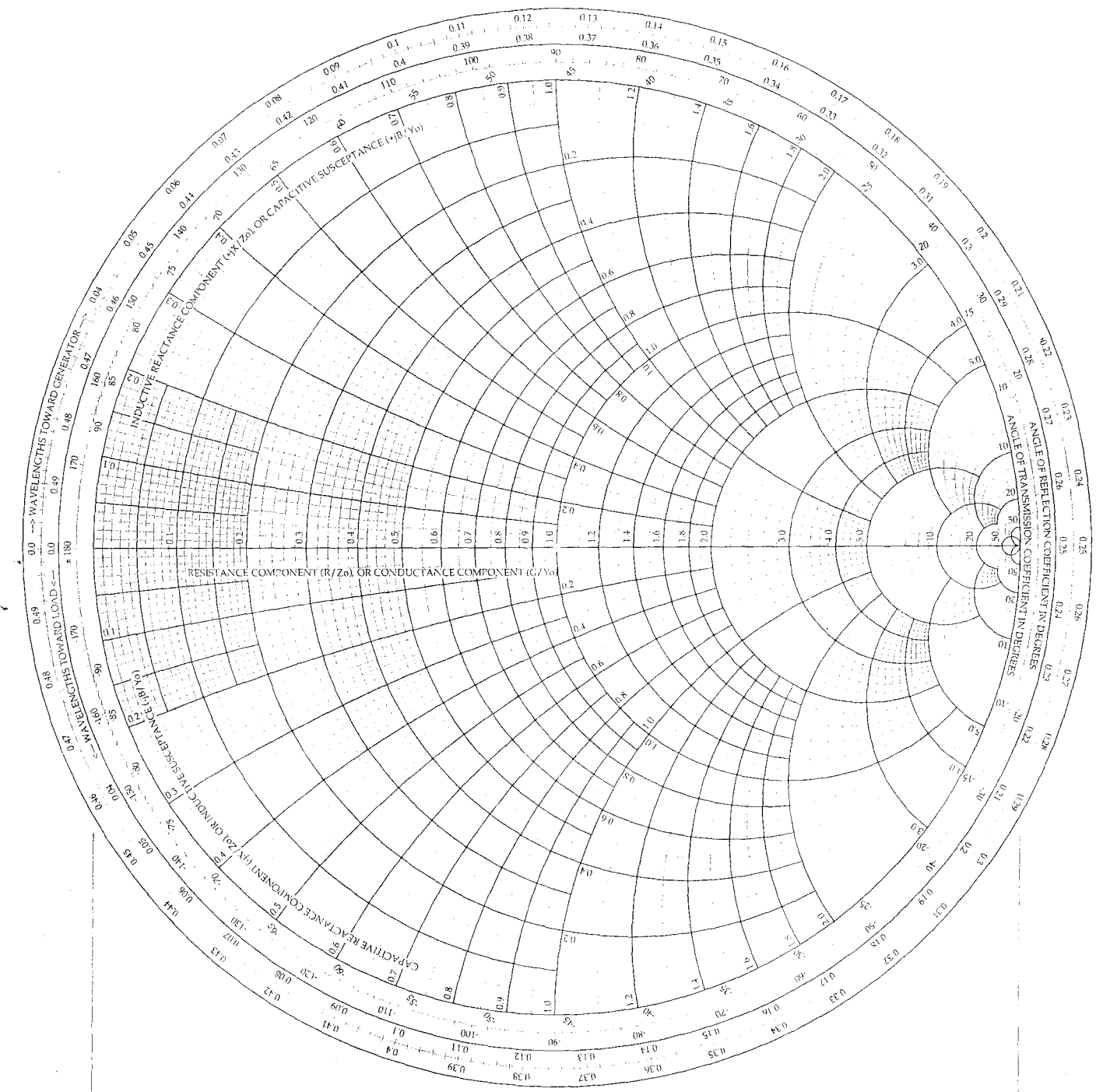
OR

Q.6 Why DTH antenna are parabolic in shape? Explain with the help of equations of HPBW and FNBW. (10)

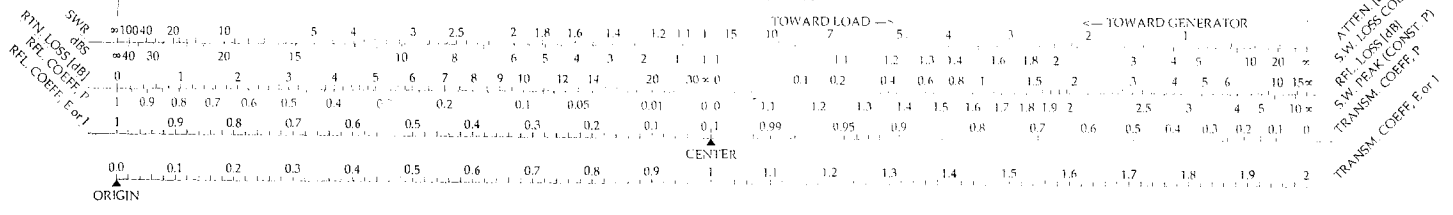
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The Complete Smith Chart

Black Magic Design



RADIALLY SCALED PARAMETERS



ATTEN. LOSS
 SWR LOSS COEFF
 RETN. LOSS (dB)
 SWR PEAK CONST. P
 TRANSM. COEFF. P
 TRANSM. COEFF. E or I