UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Mid Semester Examination, March 2019

Programme Name: B.Tech ECE   Semester   : IV
Course Name   : Engineering Electromagnetism   Time   : 02 hrs
Course Code   : ECEG 2012   Max. Marks : 100
Nos. of page(s)   :2
Instructions:

SECTION A		4x5=20

S. No.		Marks	CO
1.	Define the inconsistency of ampere circuit law	5	CO1
2.	Brewster Angle in the parallel polarization incident obliquely on a dielectric material	5	CO2
3.	Write about SC and OC transmission line.	5	CO4
4.	Write about structure of microstrip	5	CO5

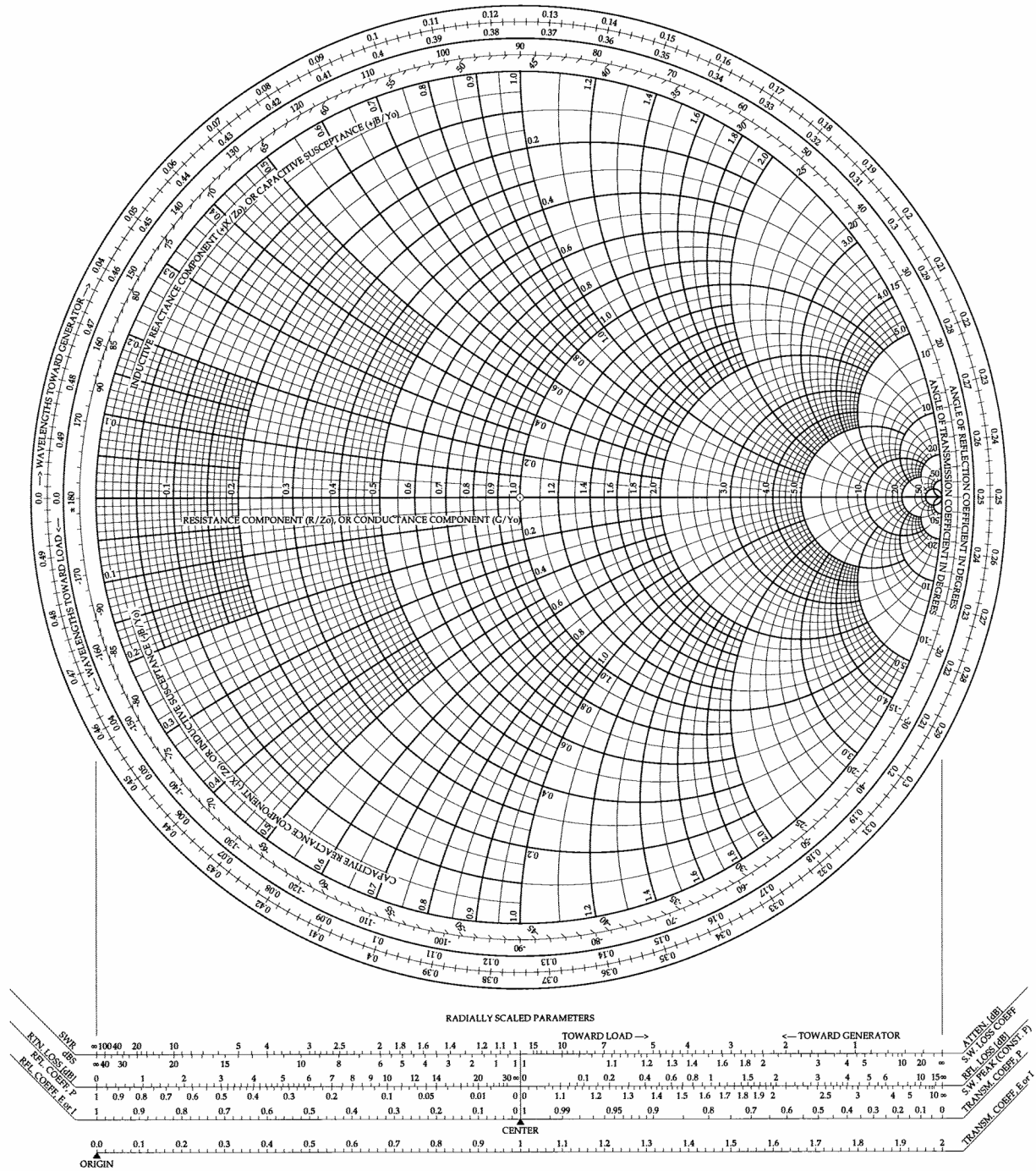| SECTION B 4x10=40			
Answer any four questions			
5.	A free charge of copper is $1.8 \times 10^{10} \, C/m^3$. For a current density of $8 \times 10^6 \, A/m^2$, find the electric field intensity and drift velocity. Conductivity of copper is $5.8 \times 10^7 S/m$	10	CO1
6.	Assume a conductor, $H = 5 \times 10^4 \rho^2 a_\Phi A/m$. (i) Find J (b) Calculate the current through the surface of $0 < \rho < 2$, $0 < \Phi < 2\pi$, z=0.	5 5	CO2
7.	Derive the relation between Electric field strength and magnetic field strength of an uniform plane wave propagating in free space.	10	CO2
8.	Explain the impedance characteristics and of transmission line with the help of section of length $(l+\lambda/2)$ and $(l+\lambda/4)$.	10	CO4
9.	Write down the analysis of TE wave in rectangular wave guide.	10	CO5

SECTION-C 2x20=40			
Answer any two questions			
10.	(a)For a transmission line per unit lenghth parameters are $0.01\Omega, 0.5$ Mhm,5pF/m and 0.1 ℧/m.Find the complex propagation constant at (a) 1MHz (b) 1 GHz. (b)A transmission line operating at 50MHz has Zo=50Ω, α=0.4Np/m,β=1.5 rad/m. Find the transmission line primary parameters R,L,G and C.	10 10	CO4
11.	(a)Derive the ratio of Electric and magnetic field strength of wave incident		CO3

	normally at the interface of two dielectric materials with constants ε_1 and ε_2.	12	
	(b) Write about the **σ/ωε** ratio and explain the demarcation of materials on the basis of ratio.	8	
12.	(a)Draw the following on the smith Chart .The normalizing impedance is 25Ω. (i)25+j50Ω. (ii)0-j60Ω (iii)constant VSWR circle for ρ=2.0 (iv)Ѓ=0.3∟60^0	10	CO4
	(b)Derive an Electric field and Magnetic field when the wave incident normally on the conductor.	10	CO3

Roll No :

RADIALLY SCALED PARAMETERS

TOWARD LOAD →   ← TOWARD GENERATOR

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	SECTION A		4x5=20

S. No.		Marks	CO
1.	Define the inconsistency of ampere circuit law	5	CO1
2.	Write the definitions and expressions for group velocity and phase velocity of a wave.	5	CO2
3.	Explain the categorization of parallel and perpendicular polarization	5	CO3
4.	Write about structure of microstrip	5	CO5

	SECTION B		4x10=40
	Answer any four questions		

5.	A free charge of copper is $1.8 \times 10^{10}\,C/m^3$. For a current density of $8 \times 10^6\,A/m^2$, find the electric field intensity and drift velocity. Conductivity of copper is $5.8 \times 10^7 S/m$	10	CO1
6.	Assume a conductor, $H = 10^3 \rho^2 a_\Phi A/m$. (i) Find J (b) Calculate the current through the surface of $0 < \rho < 2$, $0 < \Phi < 2\pi$, $z=0$.	5 5	CO2
7.	Derive an Electric field and Magnetic field when the wave incident normally on the conductor.	10	CO3
8.	Evaluate the secondary constants of thee transmission line section which has the length l, voltage V , current I and the primary constants are resistance R and inductance L conductance G and capacitance C with help of neat sketch	10	CO4
9.	(a)Write about the cutoff frequency of rectangular wave guide. (b)Justify the inference of divergence of magnetic field is null.	5 5	CO4 CO1

	SECTION-C		2x20=40
	Answer any two questions		
10.	(a)For a transmission line per unit lenghth parameters are 0.01Ω,0.5 Mhm,5pF/m and 0.1 ℧/m.Find the complex propagation constant at (a) 1MHz (b) 1 GHz. (b)Write down the analysis of TE wave in rectangular wave guide.	10 10	CO4 CO5

11.	a)Write about the **σ/ωε** ratio and explain the demarcation of materials on the basis of ratio.	6	CO3
	(b)Draw the following on the smith Chart .The normalizing impedance is 25Ω. (i)25+j50Ω. (ii)0-j60Ω (iii)constant VSWR circle for ρ=2.0 (iv)Ѓ=0.3∟60^0	14	CO4
12.			
	(a)A transmission line operating at 50MHz has Zo=80Ω, α=0.04Np/m,β=1.5 rad/m. Find the line parameters R,L,G and C.	14	CO4
	(b)Derive the convection and conduction Currents.	6	CO1

Roll No

RADIALLY SCALED PARAMETERS