

II B. Tech II Semester Supplementary Examinations, November - 2019
ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

(Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answer **ALL** the question in **Part-A**

3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) If $D=(2y^2+z)\mathbf{a}_x$ find ρ_v at $(-1,0,3)$ (2M)
- b) If a point charge is place in E&B fields, calculate 'F' on a Charge Particle? (3M)
- c) List out the modified time varying Maxwell's equations in a free space? (2M)
- d) Write the applications of Poynting theorem. (2M)
- e) Define distortion less line and give the condition for it. (2M)
- f) List out the applications of Smith Chart? (3M)

PART -B

2. a) Derive the Capacitance value of a Parallal plate capacitor? (7M)
- b) Point charges 1 mC and -2mC are located at $(3,2,-1)$ and $(-1,-1,4)$, (7M)
 respectively. Calculate the electric force on a 10nC charge located at $(0,3,1)$
 and the electric field intensity at that point.
3. a) Define Biot-Savart law? How it will useful to derive H? Explain? (7M)
- b) Write the maxwell's equations of EM static field in point form and integral (7M)
 form?
4. a) A uniform wave in air has (7M)
 $E=10\cos(2\pi \times 10^6 t - \beta z)\mathbf{a}_y$ V/m .Calculate β and λ .
- b) Derive the wave equations in a lossless dielectric? (7M)
5. a) Prove that E&H reflected waves are standing waves when uniform plane wave (7M)
 is incident normal to the free space and conductor boundary surface?
- b) A 20 MHz uniform plane wave propagates through a lossy material so that It (7M)
 has a phase shift of 0.5 rad/m and its amplitude is reduced by 20% every meter
 traveled. Calculate α , δ .
6. a) A short – circuited Coaxial transmission line has $Z_0=60\Omega$ and $\gamma =j8.5/m$. (7M)
 Calculate the input impedance if the length of the line is a) $3\lambda/4$ b) $\lambda/8$
- b) A lossy transmission line has $R=3.5\Omega/m$, $L=2\mu H/m$, $C=120pF/m$, and (7M)
 $G=0$ at 400MHz, determine α , β , Z_0 .
7. a) A 50 Ω line is terminated to a load with an unknown impedance .The standing (7M)
 Wave ratio $S=2.4$ on the line and voltage maximum occurs $\lambda/8$ from the Load.
 Determine the load impedance.
- b) Explain i) Single stub and ii) Double stub Matching (7M)