

Code No: **R15A0406****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Supplementary Examinations, April 2023**Electromagnetic Theory and Transmission Lines**

(ECE)

Roll No									
---------	--	--	--	--	--	--	--	--	--

Time: 3 hours**Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

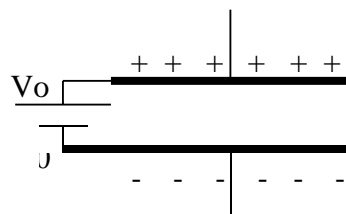
- 1). a Define capacitance from the concept of electric field. [2M]
- b Discuss the applications of Gauss Law [3M]
- c State Biot Savart's law. [2M]
- d Derive the integral form of the Maxwell's equation magnetic fields from point form of the Maxwell's equation. [3M]
- e Write Poynting Theorem. [2M]
- f Describe about the propagation of plane waves in lossy dielectrics. [3M]
- g What are primary and secondary constants? [2M]
- h Write the condition for distortion less and minimum attenuation. [3M]
- i What is the importance of impedance transformation in transmission lines? [2M]
- j Derive the relation between VSWR and Reflection Coefficient. [3M]

PART-B (50 MARKS)**SECTION-I**

- 2 a) Define electric potential and obtain expression for electric potential due to n-point charges. [5M]
- b) An infinitely long uniform line charge is located at $y=3$, $z=5$ of $PL=30\text{nc/m}$. Find 'E' at the origin. [5M]

OR

- 3 The two plates of parallel plate capacitor are separated by a distance d and maintained at potentials $0V$ and V_0 as shown in the figure. Assuming negligible fringing effects at the edges, determine
 - i) The potential at any point between the plates [5M]
 - ii) Surface charge density of the plates. [5M]



SECTION-II

- 4 Express Maxwell's equations in dielectric medium in integral forms along with word statements. [10M]

OR

- 5 a) With the help of Ampere's work law find the magnetic field in a closely wound toroidal coil? [5M]
b) A toroid has 1000 turns with its inner and outer radii of 10cm and 12cm respectively, if a current of 2 Amperes produces a flux density of 2 Tesla in the core, find the relative permeability of the core? [5M]

SECTION-III

- 6 Show that when a plane wave is incident on perfect conductor normally, the resultant wave is standing wave. [10M]

OR

- 7 a) Determine the intrinsic impedance in free space for a uniform plane wave. [5M]
b) Determine propagation constant, phase velocity and intrinsic impedance of uniform plane wave in a good conductor and dielectric materials. [5M]

SECTION-IV

- 8 Explain the conditions which are used for minimum attenuation in transmission lines. [10M]

OR

- 9 a) Derive an expression for input impedance of a transmission line terminated with a load of Z_R [5M]
b) Characteristic Impedence of a uniform transmission line is $2K\Omega/m$ at 800Hz and propagation constant is $0.054 \angle 87^\circ /m$ find the primary constants. [5M]

SECTION-V

- 10 a) Describe the construction of smith chart and give its applications. [5M]
b) Explain the significance of V_{max} and V_{min} position along the transmission line for a complex load Z_R . Calculate the impedance at this position. [5M]

OR

- 11 Explain the technique of the single stub matching and discuss the operation of the quarter wave transformer. [10M]
