Code: 4G344

II B.Tech. II Semester Supplementary Examinations May / June 2022

Field Theory and Transmission Lines

(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Find the divergence and curl of vector field if $A=e^{xy} a_x + \sin xy\, a_y + \cos^2 xz\, a_z$ 7M

   b) Define Del operator ∇ or Del (function). Explain the different operations using Del operator.   7M

OR

2. a) Derive the expression for second Maxwell's equation and explain how electric field intensity (E) relates with Electric potential (V)..   7M

   b) Define Electric flux Density? Give the Relation between D & E?   7M

UNIT–II

3. a) Discuss about linear, isotropic, homogeneous mediums.   7M

   b) Define conductor ?And explain its properties with neat sketch   7M

OR

4. a) The capacitance of the conductor formed by the two parallel metal sheets each 100cm^2, in area separated by a dielectric 2mm thick is 2×10^{-10} µf, a potential of 20KV is applied to it. find i) electric flux ii) potential gradient in kV/m iii) the relative permittivity of materials iv) Electric flux Density.   7M

   b) Derive the expression for a capacitance of coaxial capacitor with neat schematic.   7M

UNIT–III

5. a) Write a technical note on Faraday's law of Electro Magnetic induction?   7M

   b) Give the details about magnetic vector and scalar potential?   7M

OR

6. a) What will be the nature of force between the two current elements if the currents are in the same & opposite directions, explain with necessary derivations?   7M

   b) Discuss about transformer and motional emf's using Faraday's law.   7M

UNIT–IV

7. a) Analyze the plane waves in lossless dielectrics   7M

   b) Derive the wave equations for free space.   7M

OR

8. Derive equations for uniform plane waves in lossy dielectrics   14M

UNIT–V

9. a) Explain primary and secondary constants of transmission line with relevant expressions.   7M

   b) A generator of volt,1,000Hz,supplies power to 1,000Km,long open wire line terminated in Z_0(characteristics impedance) and having following parameters : R= 10.4ohm's., L=0.0037 henry,G=0.8microohms ,C=0.00835microfarad's. calculate Z_0 and P.   7M

OR

10. a) What is line distortion? Derive the condition for distortion less line?   7M

    b) Determine and Derive condition for minimum attenuation.   7M

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