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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year I Semester Regular & Supplementary Examinations March-2023

ELECTROMAGNETIC FIELDS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Given point P (-2,6,3) and $A = y \mathbf{a}_x + (x+z) \mathbf{a}_y$. Express A in Cylindrical coordinates. CO1 L3 6M
 b Transform the vector $A = 3\mathbf{i} - 2\mathbf{j} - 4\mathbf{k}$ at P (x=2, y=3, Z=3) to cylindrical coordinates. CO1 L3 6M

OR

- 2 Find the gradient of the following scalar fields: CO1 L3 12M
 i) $V = e^{-z} \sin 2x \cosh y$ ii) $U = r^2 z \cos \Phi$ iii) $W = 10r \sin^2 \theta \cos \Phi$

UNIT-II

- 3 The Electric flux density is given as $D = (r/4) \mathbf{a}_r$ n C/m² in free space. Calculate: The Electric field intensity at r=0.25 m, The total charge within a sphere of r = 0.25 m CO2 L3 12M

OR

- 4 a What is the relation between electric flux density and electric field intensity. CO2 L1 4M
 b Define dipole moment. CO2 L1 2M
 c Define an electric dipole. CO2 L1 2M
 d State vector form of coulombs law. CO2 L1 2M
 e Derive Maxwell second equation. CO2 L1 2M

UNIT-III

- 5 a Derive the continuity equation. What is its physical significance? CO3 L2 6M
 b Derive the point form of ohms law. CO3 L2 6M

OR

- 6 Explain the phenomenon of polarization when a dielectric slab is subjected to an electric field. CO3 L4 12M

UNIT-IV

- 7 Using Biot-savart's law. Find $H \rightarrow$ and $B \rightarrow$ due conductor of finite length. CO4 L2 12M

OR

- 8 Calculate the inductance of a 10 m length of coaxial cable filled with a material for which $\mu_r = 80$ and radii inner and outer conductors are 1mm and 4mm respectively. CO4 L3 12M

UNIT-V

- 9 Write Maxwell's equation in good conductors for time varying fields and static fields both in differential and integral form. CO6 L4 12M

OR

- 10 a Define skin depth. CO5 L1 2M
 b Define displacement current. CO5 L1 2M
 c State Faraday's law of electromagnetic induction. CO5 L1 2M
 d Write Maxwell equations in time varying fields. CO6 L1 4M
 e Define pointing vector. CO5 L1 2M

*** END ***

