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Reg. No: ☐☐☐☐☐☐☐☐☐☐

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular Examinations July-2021
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 Convert point P(1,3,5) from cartesian to cylindrical and spherical co-ordinates   L4   6M
system.

b Transform the vector field W=10 ax -8 ay +6 az to cylindrical co-ordinate   L1   6M
system at point P (10 ,-8, 6)

OR

2 a Given point P (-2,6,3) and A=y ax +(x+z) ay. Express A in Cylindrical   L4   6M
coordinates

b Transform the vector A= 3i-2j-4K at P (x=2, y=3, Z=3) to cylindrical   L4   6M
coordinates

UNIT-II

3 a State and explain Coulomb's law indicating clearly the units of quantities in   L1   6M
the equation of force?

b State and prove Gauss's law and write limitations of Gauss's law?   L2   6M

OR

4 a Determine the Electric filed intensity at P(-0.2, 0, -2.3) m due to a point   L4   6M
charge of 5 nc at Q (0.2,0.1, -2.5) m in air.

b An infinitely long uniform line charge is located at y=3, Z=5. If ρL = 30 n   L4   6M
C/m, find the filed intensity E at i) origin , ii) P(0,6,1) and iii) P (5,6,1)

UNIT-III

5 a Derive the continuity equation. What is its physical significance?   L1   6M

b Derive the point form of ohms law?   L1   6M

OR

6 a Derive the expression for parallel plate capacitor and capacitance of a co-axial   L4   6M
cable?

b A parallel plate capacitor has an area of 0.8 m2 separation of 0.1 mm with a   L4   6M
dielectric for which Er = 1000 and a field of 106 V/m. Calculate C and V

UNIT-IV

7 a Explain maxwell's second equation?   L1   6M

   b State and explain ampere's circuital law?   L1   6M

OR

8 a A Point charge of Q=-1.2 C has a velocity V=(5 ax +2 ay -3az)m/s. Find the   L4   6M
      magnitude of the force exerted on the charge if i) E= -18 ax +5 ay -10 az V/m
      and ii) B=-4 ax +4 ay +3 az T

   b Determine the force per meter length between two long parallel wires A and B   L4   4M
      separated by distance 5 cm in air and carrying currents of 40 A in the same
      direction.

UNIT-V

9 Write Maxwell's equation in good conductors for time varying fields and static   L1   12M
   fields both in differential and integral form?

OR

10 Explain faradays law of electromagnetic induction and there from derive   L1   12M
    maxwell's equation in differential and integral form?

*** END ***