



R20 Regulation
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code:3P3BE

B.Tech III Semester Regular Examinations, February 2022

ELECTRO MAGNETIC FIELDS (ELECTRICAL & ELECTRONICS ENGINEERING)

Maximum Marks: 70

Date:25.02.2022 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Obtain the gradient of $V=10r\sin^2\theta\cos\phi$
- 2 Convert the point P (5, 1, 3) from Cartesian to spherical coordinates.
- 3 Write the significance of coulomb's law.
- 4 Write short notes on Electric dipole.
- 5 State Ampere's circuital law and its limitations of Ampere's circuital law?
- 6 Define Magnetic flux density.
- 7 What is Lorentz force equation?
- 8 Give any two dissimilarities between self-inductance and mutual inductance.
- 9 Mention the properties of uniform plane wave.
- 10 Define displacement current

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Obtain the differential length, surface, volume element in cylindrical and spherical systems. 10M

OR

- 12 Given $D= 2rz^2\mathbf{a}_r + r\cos^2\phi\mathbf{a}_z$. Prove divergence theorem. 10M

- 13 Explain in detail about any two applications of Gauss law with neat diagrams. 10M

OR

- 14 Determine the electric field intensity at P(-0.2,0,-2.3) due to a point charge of +5nC at Q (0.2,0.1,-2.5) in air. All dimensions are in meter. 10M

- 15 From the Bio Savart's law, write the expression for magnetic field intensity at a point P and distance R from the infinitely long straight current carrying conductor. 10M

OR

- 16 Explain in detail about scalar and vector magnetic potentials. 10M

17 State magnetization? Describe the classification of magnetic materials with examples. 10M

OR

18 Obtain the boundary conditions of normal and tangential components of magnetic field at the interface of two media with different dielectrics. 10M

19 Derive the Maxwell's equation in differential and integral forms with necessary explanation. 10M

OR

20 State and prove Poynting theorem. 10M