

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2020****Subject Code:3140912****Date:11/02/2021****Subject Name:Electromagnetic Fields****Time:02:30 PM TO 04:30 PM****Total Marks:56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

	<b>MARKS</b>
<b>Q.1</b> (a) Explain cylindrical coordinate system in brief.	<b>03</b>
(b) Explain Electrical dipole.	<b>04</b>
(c) Explain spherical coordinate system and give the relationship between Cartesian and spherical coordinate system.	<b>07</b>
<b>Q. 2</b> (a) State and explain Coulomb's law.	<b>03</b>
(a) State and explain the Gauss's law.	<b>04</b>
(b) Obtain equation for flux density due to infinite line charge using Gauss's law.	<b>07</b>
<b>Q.3</b> (a) Define displacement current and current density.	<b>03</b>
(b) Derive the point form of the continuity equation.	<b>04</b>
(c) Obtain the Expression for field intensity <b>H</b> at the center of a circular carrying current <b>I</b> , using Biot-Savart law.	<b>07</b>
<b>Q.4</b> (a) Explain concept of dot product and cross product.	<b>03</b>
(b) Explain phenomenon of polarization.	<b>04</b>
(c) Discuss Poisson's and Laplace equation.	<b>07</b>
<b>Q.5</b> (a) Classify magnetic materials.	<b>03</b>
(b) Explain the physical significance of the term: Curl of a vector.	<b>04</b>
(c) Derive Maxwell's equation in integral and Point form.	<b>07</b>
<b>Q.6</b> (a) Explain difference between steady magnetic field and time varying magnetic	<b>03</b>
(b) Define divergence.	<b>04</b>
(c) Explain Stoke's theorem with its mathematical expression.	<b>07</b>
<b>Q.7</b> (a) Explain concept of electric potential difference.	<b>03</b>
(b) State and explain Ohm's law in point form.	<b>04</b>
(c) Explain boundary conditions between two perfect dielectric materials.	<b>07</b>
<b>Q.8</b> (a) Explain concept of scalar magnetic potential and magnetic vector potential.	<b>03</b>
(b) Explain Electrical field as the Gradient of the electrical potential.	<b>04</b>
(c) State and explain ampere's circuit law, both in integral differential form as used in magnetic field.	<b>07</b>

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