Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C. Sem - IV Examination June- 2011

Subject code: X40904

Subject Name: Theory of Electromagnetics

Date:08/06/2011 **Time: 10.30 am – 01.00 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	State and explain divergence theorem.	**07**
	(b)	State and Explain coulomb's law and hence explain electric field.	**07**
Q.2	**(a)**	State and Explain Stoke's theorem.	**07**
	(b)	State and Explain Ampere's Circuital law. What is the nature of force for two parallel conductors carrying current in opposite direction?	**07**
		OR	
	(b)	Explain electrostatic precipitator.	**07**
Q.3	**(a)**	Explain Cartesian co-ordinate system. Also explain transformation of vector from Cartesian to cylindrical co-ordinate system.	**07**
	(b)	State Biot-Savart's law. Also derive the mathematical and Integral form of Biot-Savart's law.	**07**
		OR	
Q.3	**(a)**	Show that force $F = Blv$, Where B = Magnetic flux density, l = Active length, v = Linear velocity = $r\omega$.	**07**
	(b)	Given $\overline{A} = 2\overline{a_x} - 5\overline{a_y} - 4\overline{a_z}$ and $\overline{B} = 3\overline{a_x} + 5\overline{a_y} + 2\overline{a_z}$ Find the following.	**07**

1) $\bar{A} + \bar{B}$.
2) $|\bar{A}|$.
3) $|\bar{B}|$.
4) $\bar{A} \cdot \bar{B}$.
5) The angle between $\bar{A}$ and $\bar{B}$.
6) $\bar{A} \times \bar{B}$.
7) The unit vectors normal to the plane containing $\bar{A}$ and $\bar{B}$.

Q.4	**(a)**	Write short note on Equipotential surfaces.	**07**
	(b)	Write short note on capacitor for parallel plate capacitor.	**07**
		OR	
Q.4	**(a)**	Explain the lightning during thunder storms.	**07**
	(b)	Write down Poisson's and Laplace's Equations.	**07**
Q.5	**(a)**	Draw the sketch for electromagnetic fields for single phase line conductors 90 and return when it caries current at potential V.	**07**
	(b)	Explain Gauss's Law.	**07**
		OR	
Q.5	**(a)**	Develop expression for capacitance for concentric conducting spheres.	**07**
	(b)	Explain corona.	**07**

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