Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: X40904 **Date: 23-06-2014**

Subject Name: Theory of Electromagnetics

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)**	Given three points A(2,-3,1),B(-4,-2,6) and C(1,5,-3),find (i)the vector from A to C (ii) the unit vector from B to A (iii) the distance from B to C (iv) the vector from A to the midpoint of the straight line joining B to C (v) calculate the length of the perimeter of triangle ABC	**07**
	(b)	Transform B= ya_x-xa_y+za_z into cylindrical system	**07**
Q.2	**(a)**	Explain vector form of Coulomb's law with statement.	**07**
	(b)	Three point charges q1=10^{-6}C ,q2=10^{-6}C and q3= 0.5×10^{-6}C are located the corners of an equilateral of 50 cm side. Determine the magnitude and direction of force on q_3	**07**
		OR	
	(b)	Find the expression for the electric field at P(x,y,z) due to a point charge Q Coulomb at (x_1,y_1,z_1) using Coulomb's law of force.	**07**
Q.3	**(a)**	State and explain Gauss's law. Also explain application of Gauss's law.	**07**
	(b)	State the condition for special Gaussian Surfaces. Also state the Divergence theorem.	**07**
		OR	
Q.3	**(a)**	Define electric dipole and derive expression for E due to dipole.	**07**
	(b)	If the scalar potential is given by V=8x+6y^2-3$z^{1/2}$ find (i)E (ii)E at (3,4,9)	**07**
Q.4	**(a)**	Derive Poisson's and Laplace's equation.	**07**
	(b)	Explain application of numerical techniques in engineering.	**07**
		OR	
Q.4	**(a)**	Difference between convention and conduction also give relationship between J, ρ_V and V	**07**
	(b)	Explain boundary condition for dielectric material.	**07**
Q.5	**(a)**	Explain Biot-savart's law	**07**
	(b)	Write shot notes on stroke's theorem.	**07**
		OR	
Q.5	**(a)**	Give the expression of point form of Maxwell's equation derived from Ampere's law for static field.	**07**
	(b)	Derived Lorenz force equation.	**07**

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