Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (Old) EXAMINATION – WINTER 2019

Subject Code: 160906 **Date: 09/12/2019**

Subject Name: Theory of Electromagnetics

Time: 02:30 PM TO 05:00 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)**	Explain dot product and cross product of two vectors. If the vector field G=y a_x-2.5x a_y+3a_z and the point Q (4, 5 ,2),find the vector component of G at Q in the direction of a_n= 1/3 (2a_x+ a_y- a_z).	**07**
	(b)	Find $\nabla \cdot \bar{A}$ and $\nabla \times \bar{A}$ at $P(2,-1,3)$, if $\bar{A} = 2xya_x + za_y + yz^2a_z$.	**07**
Q.2	**(a)**	State Coulomb's law of electric for various type of charge distribution	**07**
	(b)	Define divergence and its physical significance.	**07**
		OR	
	(b)	Explain boundary condition for dielectric material.	**07**
Q.3	**(a)**	State and explain Biot-Savart's law for static magnetic fields as applied to different types of current distribution	**07**
	(b)	Derive the expression of Electric field intensity (E) due to infinite uniform sheet charge distribution in free space.	**07**
		OR	
Q.3	**(a)**	Derive the equation of Electric field intensity (E) due to infinite long line charge located on the Z axis.	**07**
	(b)	A current element I ΔL = 2π (0.6 a_x-0.8a_y) μ A is situated at a point (4, -2,3). Find the incremental field ΔH at a point (1,3,2).	**07**
Q.4	**(a)**	Explain Ampere's circuital law.	**07**
	(b)	Derive the expression curl H = J.	**07**
		OR	
Q.4	**(a)**	State and explain Stokes theorem.	**07**
	(b)	State and Explain Lorentz force equation on charge particle and explain the concept of magnetic torque	**07**
Q.5	**(a)**	Derive Poisson's and Laplace's equation	**07**
	(b)	Explain concept of potential gradient and prove that E = - ∇ V	**07**
		OR	
Q.5	**(a)**	States explain Gauss's law. Obtain electric field intensity of line charge using Gauss's law	**07**
	(b)	Write Maxwell equation in point form and in integral form.	**07**

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