Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Summer Examination-2016

Subject Name: Electromagnetics

Subject Code: 4TE06ELM1 **Branch: B.Tech (EEE,EE)**

Semester: 6 **Date :06/05/2016** **Time : 02:30 To 05:30** **Marks : 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) Electric field intensity is a quantity 1
(a) scalar (b) vector (c) both (a) and (b)

b) Electric displacement is a_____quantity. 1
(a) scalar (b) vector (c) both of the above (d) none of the above

c) Which of the following is not a scalar field? 1
(a) Displacement of a mosquito in space (b) Light intensity in a drawing room (c) Temperature distribution in your classroom (d) Atmospheric pressure in a given region

d) Which of the following is a mathematically incorrect expression? 1
(a) grad div (b) div curl (c) grad curl (d) curl grad

e) Which of the following is zero? 1
(a) grad div (b) div grad (c) curl grad (d) curl curl

f) Which of these is correct? 1
(a) A X A = $|A|^2$ (b) A X B + B X A = 0 (c) A • B • C = B • C • A

g) The relative permittivity has the following units 1
(a) F/m (b) m/F (c) Wb/m (d) no units

h) Gravitational and electric forces are inversely proportional to the 1
(a) distance (b)square of distance (c) mass (d)square of mass

i) The value of E within the field due to a point charge can be found with the help of 1
(a) Faraday's laws (b) Kirchhoff s laws (c) Coulomb's laws

j) At a point may be defined as equal to the lines of force passing normally through a unit cross section at that point. 1
(a) Electric intensity (b) Magnetic flux density (c) Electric flux

k)	Electric intensity at any point in an electric field is equal to the at that point.				1
	(a) electric flux	(b) magnetic flux density	(c) potential gradient	(d) none of the above	
l)	Law stating force directly proportional to charges and inversely proportional to square of radius is called				1
	(a) Newton's law	(b)coulombs law	(c)gauss's law	(d)Ohm's law	
m)	Electric field lines exerting force on a charge are also known as				1
	(a)force of lines	(b)lines of force	(c)force lines	(d)both a and b	
n)	Potential difference and potential between two points are				1
	(a)scalar quantities	(b)vector quantities	(c)base quantity	(d)both a and b	

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

A Explain cylindrical co-ordinate system and differential elements in cylindrical co-ordinate system. **(07)**

B Given three points A(2,-3,1), B(-4,-2,6) and C(1,5,-3), Find **(04)**
i) The Vector from A to C
ii) The Unit vector from B to A
iii) The distance from B to C.

C We illustrate this transformation procedure by transforming the vector filed **(03)**
$G = \left(\frac{xz}{y}\right)a_x$ into spherical components and variables.

Q-3 **Attempt all questions** **(14)**

A Explain Coulomb's law and deduce the vector form of force equation between two point charges. **(07)**

B State Divergence theorem & Write mathematical expression for Divergence theorem **(07)**

Q-4 **Attempt all questions** **(14)**

A An infinitely long, uniform line charge is located at y=3, z=5. If ρ_L= 30 nc/m, Find E at: i) The origin, ii) PB (0,6,1), iii) PC (5,6,1). **(07)**

B State and prove the Gauss's law. **(07)**

Q-5 **Attempt all questions** **(14)**

A Express Electric flux density due to a point charge Q placed at origin. Hence obtain the relation between *D* & *E*. **(07)**

B Determine the electric field intensity of an infinite straight line charge carrying uniform line charge density of ρ_L C/m. **(07)**

Q-6 **Attempt all questions** **(14)**

A Explain and derive the boundary conditions for a conductor free space interface **(7)**

B What is the relation between magnetic flux density and magnetic field intensity? **(04)**

	C	Explain the electric field due to a continuous volume charge distribution with help of sketch.	**(03)**
Q-7		**Attempt all questions**	**(14)**
	A	State and explain Biot-Savart law	**(7)**
	B	Derive Poisson's and Laplace's equation.	**(04)**
	C	Explain with sketch Hertzian dipole antenna	**(03)**
Q-8		**Attempt all questions**	**(14)**
	A	Derive the expression for the attenuation constant ,phase constant And intrinsic impedance for a uniform plane wave in a good conductor.	**(07)**
	B	Explain basic principle of Antenna	**(07)**