

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.

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- 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) $A \times A = |A|^2$ (b) $A \times B + B \times A = 0$ (c) $A \cdot B \cdot C = B \cdot C \cdot A$
- 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) Kirchoff'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 (c) potential (d) none of the
 density gradient above
- l) Law stating force directly proportional to charges and inversely proportional to 1
 square of radius is called
 (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 (b)vector (c)base quantity (d)both a and b
 quantities quantities

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 (07)
 point charges.
B State Divergence theorem & Write mathematical expression for Divergence (07)
 theorem
- Q-4 Attempt all questions (14)**
A An infinitely long, uniform line charge is located at y=3, z=5. If $\rho_L = 30 \text{ nc/m}$, Find (07)
 E at: i) The origin, ii) PB (0,6,1), iii) PC (5,6,1).
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 (07)
 obtain the relation between D & E.
B Determine the electric field intensity of an infinite straight line charge carrying (07)
 uniform line charge density of $\rho_L \text{ C/m}$.
- 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)**

