FACULTY OF ENGINEERING
B.E. 2/4 (EE / Inst.) II – Semester (Main) Examination, June 2014

Subject: Electromagnetic Theory

**Time: 3 Hours**   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.
PART – A

1	Name the various coordinate systems.	(2)
2	Define Dot Product with an example.	(3)
3	What is magnetization?	(2)
4	What is meant by boundary conditions for electric and magnetic fields?	(3)
5	Explain Finite element method.	(2)
6	Define Faraday's laws of Induction and Lenz's law.	(3)
7	What is uniform plane wave give an example?	(3)
8	What is wave number?	(2)
9	Mention the application of optical fiber.	(3)
10	Mention the sources of EMI.	(2)

PART – B

11 (a) Explain gradient of a scalar field and divergence of a vector field. (5)
   (b) Vectors $A = 6u_x + 5u_y + 4u_z$ and $B = 3u_x + 4u_y + 4u_z$ are situated at a point (x,y,z). Find $A+B$ and $A \cdot B$. (5)

12 (a) What is an electric dipole, derive electric field due to dipole. (5)
   (b) If the magnetic vector potential $A = -f^2/4a_z$ wb/m calculate the total magnetic flux, crossing the surface $\phi = \dfrac{\pi}{2}$, 1≤p≤2m, 0≤z≤5m. (5)

13 (a) Derive Poisson's equation for homogeneous region. (5)
   (b) Obtain electric field between two infinite parallel metal plates located in a vacuum as shown below, by (analytical one dimension solution) direct integration method. (5)
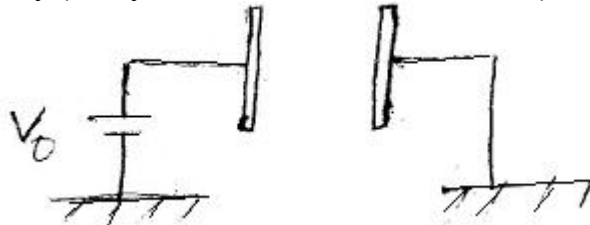
14 (a) Derive equation of continuity. (5)
   (b) Prove that uniform plane wave is a traverse electromagnetic wave. (5)

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15 (a) Give Maxwell's equations in point form and integral form. (5)
   (b) Obtain plans wave propagation in terms of propagation constant in a Lossy Dielectric Medium. (5)

16 (a) Explain controlling techniques of EMI. (5)
   (b) Calculate the wave-length of microwave signal whose frequency is 5 GHz in free space. (5)

17 Write short notes on the following:
   a) Explain spherical coordinate system. (5)
   b) Explain method of moments considering four charges distributed in the space. (5)

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