Reg. No. : | | | | | | | | | | | | |

**Question Paper Code : 52912**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2019.

Fourth Semester

Electronics and Communication Engineering

EC 6403 – ELECTROMAGNETIC FIELDS

(Regulation 2013)

(Common to PTEC 6403 – Electromagnetic Fields for B.E. Part – time for Third Semester – Electronics and Communication Engineering – Regulation 2014)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. If a vector $\vec{A} = \overrightarrow{a_x} + \overrightarrow{2a_y} + \overrightarrow{3a_z}$, find its magnitude.

2. In Cartesian coordinates, a point is described by $P(1, 2, 4)$ Identify the orthogonal planes whose intersection give this point.

3. State stokes theorem.

4. Give the relationship between potential gradiant and electric field.

5. Define dielectric strength.

6. Why water has much greater dielectric constant than mica?

7. State amperes circuital law.

8. Define magnetic moment.

9. Write down the constitutive relations.

10. State Maxwells Third equation.

PART B — (5 × 13 = 65 marks)

11. (a) Obtain the differential length, volume and surface elements in cylindrical coordinate system.

Or

(b) An infinitely long line charge of uniform density $\rho_L$ C/m is placed along Z – axis. Find the expression for electric field intensity at a point in Y – axis, which is 'a' meters away from 'Z' axis.

12. (a) State Biot Savart Law and its expression.

Or

(b) Elaborate the applications of Poisson's and Laplace's equations in detail.

13. (a) Compute the magnetic field of a long straight wire that has a circular loop with a radius of 0.05m. 2amp is the reading of the current flowing through this closed loop.

Or

(b) Derive Maxwells equation in point form and in integral form.

14. (a) Derive the Poynting vector from Maxwells equations and give its significance.

Or

(b) Derive an expression of inductance of toroid and solenoid.

15. (a) Find the expression for magnetic field intensity due to an infinite long straight conductor carrying a current of I amperes at a point which has the distance of 'a' from the conductor.

Or

(b) Derive the vector wave equation and give its physical interpretation.

PART C — (1 × 15 = 15 marks)

16. (a) Summarize the concept of transformer and motional emf.

Or

(b) Derive an expression of self-inductance and mutual inductance.

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