Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14EE2004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ELECTROMAGNETIC FIELDS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | If   1. Find the unit vector in the direction of the vector 2. Find the direction cosines of the vector and hence prove that, | CO1 | 6 |
| b. | If , find the angle between the vectors | CO1 | 5 |
| c. | A point is given by C (-3,2,1). Find its angle value in cylindrical coordinate system | CO1 | 9 |
| (OR) | | | | |
| 2. | a. | Express vector in Cartesian and cylindrical coordinates. Given, . Then find at (-3, 4, 0) and (5, π/2, -2) | CO1 | 10 |
| b. | Transform an Cartesian vector to cylindrical coordinates at a point P(2,3,5) | CO1 | 10 |
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| 3. | a. | An infinitely long line charge of uniform density ρL 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. | CO2 | 10 |
|  | b. | Derive Poisson equation from Gauss law and give its significance. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | A cylindrical capacitor consists of an inner conductor of radius ‘a’ and an outer conductor whose inner radius is ‘b’ . The space between the conductors is filled with a dielectric of permittivity and the length of the capacitor is L. Determine the capacitance of this capacitor. | CO2 | 15 |
|  | b. | Formulate the Point form of Gauss’s law. | CO2 | 5 |
|  |  |  |  |  |
| 5. | a. | Using Biot Savart Law, Formulate the due to infinitely long straight conductor. | CO1 | 15 |
|  | b. | The inductance of a single layer solenoid of 10 turns is 5 μH. Find the correct value of inductance when the number of turns is 20 and the length is doubled? | CO1 | 5 |
| (OR) | | | | |
| 6. | a. | Show the mathematical representation of Ampere’s Circuital Law. | CO1 | 5 |
|  | b. | Using Ampere’s circuital law, Evaluate the due to a coaxial cable carrying current *I*. | CO2 | 15 |
|  |  |  |  |  |
| 7. | a. | A capacitor with air as the dielectric medium has a plate area of 1cm 2 with a plate separation of 0.1mm.Find the displacement current and displacement current density for an applied voltage of 100 sin (3.14 ˟10 6)t. | CO2 | 10 |
|  | b. | Define Faraday’s law of electromagnetic induction. Describe with suitable diagrams the concept of transformer emf and motional emf | CO2 | 10 |
| (OR) | | | | |
| 8. |  | Deduce the magnetic boundary conditions between a conductor and a dielectric. | CO3 | 20 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Derive Maxwells equation in point form and in integral form. | CO3 | 10 |
|  | b. | Briefly discuss about the parameters of electromagnetic waves when propagated in dielectrics. | CO3 | 6 |
|  | c. | Mention the significance of Poynting theorem. | CO3 | 4 |

ALL THE BEST