Hall Ticket No | | | | | | | | | | |

Question Paper Code: AEEB10

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Regular), February – 2021

Regulation: IARE–R18

ELECTROMAGNETIC FIELDS

Time: 3 Hours **(EEE)** **Max Marks: 70**

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. Write about spherical coordinate systems in detail. **[5M]**
2. Determine the point form of Ohm's Law and write the properties of conductor. **[5M]**
3. State and explain Ampere's circuital law. **[5M]**
4. Obtain the expression for scalar & vector magnetic potential. **[5M]**
5. Determine the electromagnetic wave equation in free space. **[5M]**
6. Obtain the relation between current and current density. **[5M]**
7. Find the Magnetic flux density at the center of a square loop with side 5 cm carrying a direct current 10A. **[5M]**
8. State Biot-savart's law and write its application. **[5M]**

PART – B

9. Find the electric field intensity due to infinite long straight line charge distribution. **[10M]**
10. A point charge of 10μC is located at (1,2,3) and another point charge of -3 μC is located at (3,0,2) in vaccum. Find the force between them. **[10M]**
11. Obtain the expression for the capacitance of a parallel plates and deduce energy stored in terms of charge. **[10M]**
12. Determine the boundary relation at the boundary between a conductor and a dielectric. **[10M]**
13. Find the magnetic flux density at center of a circular loop of a radius b that carries current I. **[10M]**
14. If A = (3y -3) a_x + (2xy) a_y wb / m in free space, i)Find B & H at P (2, -1, 3) ii) Show that A is solenoid. **[10M]**
15. If the vector magnetic potential is given by A=$10/(x^2+y^2+z^2)u_x$, obtain the magnetic flux density in vector form. **[10M]**
16. Obtain the expression for inductance of a toroidal coil carrying current I, with N turns and the radius of toroid is 'r'. **[10M]**
17. Prove that curl of H is not equal to zero and determine the expression for modified Ampere law from Faraday's laws. **[10M]**
18. In a material for which $\sigma = 5.0(\Omega m)^{-1}$ and $\epsilon_r = 1$ the electric field intensity is E = 250sin (10^{10}t) V/m. Calculate the conduction and displacement current densities and the frequency at which they have equal magnitudes. **[10M]**

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