ACE Engineering College
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Question Paper Code: EE305PC | ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
Electromagnetic Field
(Electrical and Electronics ngineering)

Time: 3 Hours **Max. Marks: 70**

H. T. No										

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1. a)	State and explain coulomb's law with necessary equations.	7
b)	Find the electric field intensity at P(1,1,1) caused by four identical 3nC charges located at P1(1,1,0), P2(-1,1,0), P3(-1,-1,0) and P4(1, -1, 0).	7
2. a)	Derive the boundary conditions between dielectric to dielectric medium?	7
b)	Derive the expression for capacitance of two wire line.	7
3. a)	Derive the expression for magnetic field intensity due to infinitely long straight filament carrying a direct current I.	7
b)	Using Ampere's circuit law, determine the expression for H due to uniform sheet of surface current $K = K_y a_y$ in the $z = 0$ plane.	7
4. a)	Derive the expression for energy density in electrostatic field.	7
b)	Derive the expression for the force between two finite current carrying loops.	7
5. a)	Using ampere's circuit law, determine the magnetic field intensity due infinitely long coaxial transmission line.	7
b)	Explain the work done in moving a point charge in an electrostatic field	7
6. a)	Represent the Maxwell's equations both in integral form and differential form for time varying fields.	7
b)	If the electric field strength (E) of an electromagnetic wave in free space is given by $E = 8 \sin(\omega t - \beta z)\, a_y$ V/m. Find the magnetic field intensity H.	7
7. a)	Define the following terms i)Conduction current density ii) Convection current density iii) Displacement current density	7
b)	Derive and prove that the Poynting theorem.	7
8.	An electromagnetic wave propagates in a dielectric medium with $\varepsilon = 9\varepsilon_0$ along Z-direction. It strikes another dielectric medium with $\varepsilon = 4\varepsilon_0$ at $z = 0$. If the incoming wave has a maximum value of 0.1 V/m at the interface and angular frequency is 300M rad/s, determine a) reflection coefficient b) transmission coefficient c) Expression for incident, reflected and transmitted fields.	14