PVP 20

Code: 20BS1401

II B.Tech - II Semester – Regular / Supplementary Examinations
MAY - 2024

ELECTROMAGNETIC FIELD THEORY
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.
BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	State and explain Coulombs law of force between two charge points.	L2	CO1	7 M
	b)	A point charge Q_1 is 300 μC is located at (1,-1, 3) m and experiences a force $\bar{F}$= $8\overline{a_x}$ - 8 $\overline{a_y}$ - $4\overline{a_z}$ N due to other point charge Q_2 at (3,-3, 2) m. Calculate the other Charge Q_2.	L3	CO2	7 M
OR					
2	a)	Brief out Electric flux density, EFI, divergence, potential gradient and work done in electro statics.	L3	CO2	7 M
	b)	Discuss and derive the Expression for point form of Gauss's law.	L2	CO2	7 M

UNIT-II					
3	a)	Discuss and derive the Laplace and Poisson's Equations of Electro statics.	L2	CO1	7 M
	b)	Solve the Expression for Torque on electric dipole in Electric Field.	L3	CO2	7 M
OR					
4	a)	Demonstrate the Expression for E due to an electric dipole.	L3	CO2	7 M
	b)	Obtain boundary conditions between the dielectric and dielectric.	L3	CO3	7 M
UNIT-III					
5	a)	Analyze the Expression for the Magnetic Field Intensity due to a straight current carrying wire.	L4	CO4	7 M
	b)	State and Prove the Biot-Savart's law.	L3	CO4	7 M
OR					
6	a)	State and solve Ampere circuital law.	L3	CO4	7 M
	b)	The Magnetic Field Intensity $\bar{H}$ due to a infinite current carrying sheet, Assume a current $\bar{k}$ in xz-plane, Prove that, $\bar{H} = \frac{k_y}{2}\ \overline{a_n}$	L4	CO4	7 M
UNIT-IV					
7	a)	Demonstrate Lorentz law of force.	L3	CO1	7 M
	b)	Construct the expression for the inductance of a solenoid.	L3	CO4	7 M
OR					

8	a)	Obtain the expression for the inductance of a toroidal ring.	L4	CO4	7 M
	b)	Calculate the inductance of a solenoid of 200 turns wound together tightly on a cylindrical tube of 6cm in dia. The length of the tube is 60cm and solenoid is in air.	L3	CO4	7 M
UNIT-V					
9	a)	Explain Faraday's law in its integral and differential forms.	L2	CO5	7 M
	b)	Discuss about the Maxwell's equations for time varying fields.	L2	CO5	7 M
OR					
10	a)	Explain displacement current.	L4	CO5	7 M
	b)	In a material for which $\sigma = 5.0\ (\Omega m)^{-1}$ and $\sigma_r = 1$ the electric field intensity is $E = 250\ sin(10^{10}t)$ V/m. Calculate the (i) conduction current density (ii) displacement current density (iii) the frequency at which they have equal magnitudes.	L3	CO5	7 M