PVP 20

Code: 20BS1401

II B.Tech - II Semester – Regular / Supplementary Examinations
MAY - 2023

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 coulomb's law indicating clearly the units of quantities in the equation of force?	L2	CO1	7 M
	b)	Four concentrated charges $Q_1 = 0.3$ μC, $Q_2 = 0.2$ μC, $Q_3 = -0.3$ μC, Q4 = 0.2 μC are located at the vertices of a plane rectangle. The length of rectangle is 5 cm and breadth of the rectangle is 2 cm. Find the magnitude and direction of resultant force on Q_1?	L4	CO3	7 M
OR					
2	a)	Develop maxwell's first equation.	L3	CO2	7 M
	b)	A circular disc of l0 cm radius is charged uniformly with total charge of 100μC. Solve electric filed intensity at a point 20cm on its axis.	L3	CO2	7 M

		UNIT-II			
3	a)	Develop laplace and poisson's equation.	L3	CO2	7 M
	b)	Derive the continuity equation. What is its physical significance?	L3	CO2	7 M
		OR			
4	a)	Develop the expression for capacitance of parallel plate capacitor.	L3	CO2	7 M
	b)	Solve the energy stored in a capacitor made of two parallel metal plates each of 30 cm^2 area separated by 5mm in air. ε_o= $8.854x10^{-12}$. The capacitor is charged to potential difference of 500V.	L3	CO3	7 M
		UNIT-III			
5	a)	Using biot-savart law, Find $\overline{H}$ due to infinitely long straight conductor.	L3	CO4	7 M
	b)	Develop the maxwell's third equation in point and integral form.	L3	CO4	7 M
		OR			
6	a)	State and explain ampere's circuital law?	L2	CO4	7 M
	b)	A circular loop is located on $X^2+Y^2=9$ and Z=0 carries a direct current of 10A along direction. Examine H at (0, 0, 5) m.	L4	CO4	7 M
		UNIT-IV			
7	a)	Develop an expression for the force between two current carrying wires?	L3	CO4	7 M
	b)	A toroid has air core and has a cross	L3	CO4	7 M

		sectional area of $10mm^2$ it has 1000 turns and its mean radius is 10mm. Find its inductance?			
OR					
8	a)	Develop an expression for Lorentz force equation.	L3	CO4	7 M
	b)	A coil of 1000 turns is wound on a toroidal iron ring of mean radius 10cm and cross section of $3cm^2$. Find the self inductance of the winding if the relative permeability of iron is 800.	L3	CO4	7 M
UNIT-V					
9	a)	Explain faradays law of electromagnetic induction and develop the expression for induced e.m.f.	L3	CO4	7 M
	b)	State and explain the statically induced EMF and dynamically induced EMF.	L2	CO4	7 M
OR					
10	a)	Write & explain maxwell's equation for time varying fields and static fields in differential form.	L3	CO5	7 M
	b)	A copper wire carries current of 1A. Solve displacement current in the wire at 1 MHz for copper $\varepsilon=\varepsilon_o$ and $\sigma=5.8x10^7$.	L3	CO5	7 M