



VIT
Vellore Institute of Technology
(Chartered as the University under section 3 of UGC Act, 1956)

SLOT: W21+W22+Z21

Vellore – 632014, Tamil Nadu, India
SCHOOL OF ELECTRONICS ENGINEERING
FALL SEMESTER 2024-2025
Mid Term

Programme: B. Tech.	Branch: BEC	Course code: BECE205L
Course Name: Engineering Electromagnetics		Date: 22/09/2024
Class Nbr: VL2024250108761	Max Marks: 50	Duration: 90 mins
Faculty name(s): Dr. Rajkishor Kumar		

General instruction(s): 1. Answer all the questions.

Q. No	Question	Marks
1.	For a given vector $A = \rho \cos \phi a_\rho + \rho z^2 \sin \phi a_z$ Solve the following: (i) convert A into a rectangular coordinate system (ii) compute its magnitude at points (4, -5, 0).	10
2.	(a) Two point charges $-4 \mu\text{C}$ and $5 \mu\text{C}$ are located at (2, -1, 3) and (0, 4, -2). Determine the potential at (1, 0, 1), assuming the zero potential at infinity. (b) Find the divergence of the given vector: $B = e^{xy}a_x + \sin xy a_y + \cos^2 xz a_z$	5 5
3.	(a) Let $E = xy a_x + x^2 a_y$, compute the following (i) Electric flux intensity (ii) Volume charge density (b) Compute the electric field due to the given potential value $V = \rho^2(z+1) \sin \phi$	6 4
4.	In a certain conducting region, $H = yz(x^2 + y^2)a_x - y^2xz a_y + 4x^2y^2 a_z \text{ A/m}$ (i) Determine J at (5, 2, -3) (ii) Calculate the current passing through $x = -1, 0 < y, z < 2$ (iii) Show that $\nabla \cdot B = 0$	10
5.	The xy -plane serves as the interface between two different media. Medium 1 ($z < 0$) is filled with a material whose $\mu_r = 4 \mu_0 \text{ H/m}$, and medium 2 ($z > 0$) is filled with a material whose $\mu_r = 7 \mu_0 \text{ H/m}$. If the surface current density $K = 80 a_x \text{ A/m}$, and $B_1 = 2 a_x - 3 a_y + 1 a_z \text{ mT}$. Evaluate the following: (i) H_1 (ii) B_2 (iii) H_2	10