SCHOOL OF ELECTRONICS ENGINEERING

CONTINUOUS ASSESSMENT TEST – I

FALL SEMESTER 2025--2026

Programme Name & Branch: B. Tech - ECE

Course Code and Course Name: BECE205L – Engineering Electromagnetics

Name: DR. SHAMBAVI K, DR. POONKUZHALI DR. RAJESHKUMAR V, DR. SURESH KUMAR T R , DR. CHRISTINA JOSEPHINE MALATHI A, DR. TANMAYA KUMAR DAS

Class Number(s): VL20252601000503, 0504, 0506, 2616, 0508, 2632,

Exam Duration: 90 minutes **Maximum Marks:** 50 **Date of Exam:** 22-08-2025 AN

General instruction(s): • Answer All Questions

- BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply)
- Course Outcomes
  a. CO1: Analyse the co-ordinate system transformation.
  b. CO2. Evaluate and analyse Electric Fields & Electric Potential due to different Charge distributions.

Answer all the questions (5 x10 = 50 Marks)				
Q. No	**Question**	Max Marks	CO	BL
1	(a) Given $F = (y - 1)a_x + 2xa_y$, find the vector at (2, 2, 1) and its projection on **B**, where $B = 5a_x - a_y + 2a_z$.	10	CO1	
	(b) Given a vector field $\mathbf{A} = 5e^{-r}\cos\phi\, a_r - 5\cos\phi\, a_z$ in cylindrical coordinates, find curl **A** at (2, 3π/2, 0).			BL3
2	A point P_1= (12, 45°, 60°,) and a vector $\mathbf{B} = 10\, a_r + 5a_\theta + 4a_\phi$ are defined in Spherical coordinate. Express P_1 and **B** in Cartesian coordinate and evaluate **B** at P_1	10	CO1	BL3
3	A vector field **D** is given by $\mathbf{D} = [(x^2 + y)\, a_x + (xy - z)a_y + (2\, z^2)a_z]\, C/m^2$. Find the following: (a) The volume charge density at the point (2, 1, -1). (b) The total flux through a cube defined by $0 \le x \le 1, 0 \le y \le 1, 0 \le z \le 1$. C) The total charge enclosed by the cube.	10	CO2	BL3
4	Two dipoles has dipole moments p_1=5a_x+ 6a_y-4a_z μCm and p_2= 6a_x+ 5a_y-3a_z μCm are located in the free space at (2, 3, -1), and (3, 2, 2) respectively. Find the potential at (4, 1, 1) due to both dipoles p_1 and p_2	10	CO2	BL3
5	The surface z = 0 separates two perfect dielectrics. For z > 0, ε_{r1}=2 and for z < 0, ε_{r2}=8. A uniform electric field $\mathbf{E}_2$ = 2a_x-3a_y+3a_z V/m exists for z < 0, find a. $\mathbf{E}_1$ for z > 0 b. The angles $\mathbf{E}_1$ and $\mathbf{E}_2$ make with the interface c. Polarization fields in both dielectrics.	10	CO2	BL3