

Quiz 1, ECED 3300

Instructor: Sergey A. Ponomarenko.

Place, Date and Time: B311; Tuesday, October 3, 2017, 8:35 to 9:35 am.

Closed Books: Formula sheets are provided; no calculators are allowed.

Hint: Make sure to justify all your answers to get full credit.

Problem 1

1) Find the gradient of the field,

$$F = \frac{\cos \theta}{r^2}.$$

2) Determine the vector projection of the gradient of F in the z -axis direction.

Problem 2

Determine the flux of the field, $\mathbf{A} = z^2\mathbf{a}_x + x^2\mathbf{a}_y + y^2\mathbf{a}_z$, through a unit sphere centered at the origin.

Problem 3

Find the line integral of the field $\mathbf{B} = -\mathbf{a}_x$ along a semicircle of radius 1, centered at the origin in the upper half xy -plane ($y \geq 0$).