

EENG 232 ELECTROMAGNETICS 1
HW1

Date: 13/03/2017

Due: 20/03/2017

- 1) a) Given $V = xz + xy - yz$, express V in cylindrical coordinates.
b) Given $U = -x^2 + 3y^2 + 2z^2$, express U in spherical coordinates.
- 2) Let $\bar{A} = \rho \cos \phi \hat{a}_\rho + \rho z^2 \sin \phi \hat{a}_z$. Transform \bar{A} into the spherical coordinates and calculate its magnitude at point (3, -4, 0).
- 3) The vector field \bar{D} is defined as $\bar{D} = \rho^2 \cos^2 \phi \hat{a}_\rho + z \sin \phi \hat{a}_\phi$ over the closed surface of the cylinder $0 \leq z \leq 1$ and $\rho = 2$. Calculate $\oint_s \bar{D} \cdot d\bar{s}$.