Homework 6 - Bases and coordinates

Q6.1. Write down Maxwell's equations in spherical polar coordinates.

Q6.2. Show that

$$\underline{\nabla} \cdot \vec{v} = \frac{1}{\epsilon_{1 \cdots N}} \frac{\partial}{\partial x^{\alpha}} \left(\epsilon_{1 \cdots N} v^{\alpha} \right) \tag{Q6.2.1}$$

and hence write down $\underline{\nabla} \cdot \vec{v}$ in three dimensional spherical polar coordinates. Compare with the traditional vector calculus formula and explain the difference.