

Homework 6 (20 points each but problem 8)

1. Calculate curl of $f(r) r^n \hat{r}$.

2. Calculate curl of $-z \hat{e}_x + x \hat{e}_y$

3. Calculate $\nabla \cdot \nabla \phi$ and then consider case of $\phi = r^n$

4. Calculate $\nabla \times \nabla \phi$ and $\nabla \cdot (\nabla \times \vec{V})$ and $\nabla (\nabla \cdot \vec{V})$

5. Simplify $\nabla \times (\nabla \times \vec{V})$ using Levi - Civita tensor.

6. Using Maxwell equations obtain wave equations for Electric and Magnetic

Fields

7. Calculate $\nabla \cdot (f \vec{V})$ where f and \vec{V} are scalar and vector functions and $\nabla \cdot (\vec{A} \cdot \vec{B})$ where A and B are vector fields

8. (40 points) Exercises 3.6 × .5 , 3.6 × .6, 3.6 × .7,
3.6 × .8,
3.6 × .9