PRINT Your Name:____________________

Quiz 11 — April 4, 2014 – Section 7 – 12:00 – 12:50

Remove everything from your desk except this page and a pencil or pen. The solution will be posted soon after the quiz is given.

$\boxed{\text{Circle}}$ your answer. **Show your work. Your work must be correct and coherent.**
The quiz is worth 5 points.

Does the series $\sum_{n=1}^{\infty} \frac{(-1)^n e^{1/n}}{n^3}$ converge? Explain what you are doing **very thoroughly**. Your work must be correct and meaningful. **Write in complete sentences. Write from left to right and from top to bottom.**

Answer: Consider the series $\sum_{n=1}^{\infty} |\frac{(-1)^n e^{1/n}}{n^3}| = \sum_{n=1}^{\infty} \frac{e^{1/n}}{n^3}$, which is a series of positive numbers. Notice that $e < 3$ and every root of e, namely $e^{1/n}$, is also less than 3. So, $\frac{e^{1/n}}{n^3} < \frac{3}{n^3}$. The series $\sum_{n=1}^{\infty} \frac{3}{n^3}$ is 3 times the p-series with $p = 3$, which is bigger than 1. Thus, $\sum_{n=1}^{\infty} \frac{3}{n^3}$ converges. The series $\sum_{n=1}^{\infty} \frac{e^{1/n}}{n^3}$ converges by a straight comparison test and $\boxed{\sum_{n=1}^{\infty} \frac{(-1)^n e^{1/n}}{n^3} \text{ converges}}$ by the Absolute Convergence Test.