1. Is g(t)=(t/2)^2 Uniformly Continuous? Use the uniform continuity counterexample to illustrate the answer.

2. Consider

$$\begin{cases} \dot{e} = -e^3 + \theta w(t) & (\text{Tracking error dynamics}) \\ \dot{\theta} = -ew(t) & (\text{Parameter error dynamics}) \end{cases}$$

where:

- e: Tracking error (state variable),
- θ: Parameter error (adaptive parameter),
- $w(t)$: A bounded continuous function ($|w(t)| \leq W$).

Please analyze the stability or behavior of this system using Lyapunov-Like function and Barbalat's Lemma.