CH3041 Tutorial 7
Toxicology & Nuclear Chemistry

Name:

1. Describe the **toxicity characteristics** and give an example of each of the following toxicants:

   acute local poison

   systemic nerve poison

   mutagenic substance

   teratogenic substance

2. Draw a typical **dose response curve** for a highly toxic chemical showing the **LD_{50} value** and the **threshold** value. The chemical is toxic over a wide range of doses.

3. **Radon** is a naturally occurring gas, explain why it is a health hazard.

4. Explain why so much more energy can be liberated by the nuclear reaction of 1 mol of a **fissionable element** than can be liberated by a chemical reaction (eg. combustion) of 1 mol of a non-radioactive element. Illustrate your answer using equations.

5. A proposed method of storing the high level waste from nuclear power plants involves processing using the Synroc process into a stable mineral which is then buried in deep wells. **Plutonium** (^{239}Pu) is the highly toxic chemical which is most troublesome in this high level waste as it has a half life of 2.4×10^4 years. The plutonium activity is required to decrease to 0.1% of it's initial value at burial for the material to be 'safe' . Calculate how long this will take.