IS336 COMPUTER MODELING & SIMULATION

ASSIGNMENT 1:

*“This assignment will require you to produce stock & flow diagrams, VENSIM equations and graphs you have used to arrive to the correct answer”*

1. Five hundred dogs live in the wooded grassy area near the Kigamboni Bridge. Every year 100 puppies (dogs) are born. Life near the bridge takes its toll, though, and every year 120 dogs die. How many dogs will live near the bridge in 10 years?
2. Today, approximately five million (5,000,000) Mangrove trees stand tall in Mlimani Forest. A lumber company has been cutting down, harvesting, approximately one hundred thousand (100,000) trees every year. An environmental group, worried that the forest will be entirely destroyed, has been working hard to plant as many new Mangrove trees as possible. They have been able to plant approximately five thousand (5000) trees every year. How many Mangrove trees will there be in Mlimani Forest in thirty (30) years?
3. It’s Friday and Upendo is working alone at home on a group project. Upendo’s best friend feels guilty that she’s not contributing to the team effort, so she bakes Upendo an enormous plate of brownies that she brings over with many words of encouragement. Upendo nibbles on the brownies as she works. She eats a brownie every hour. As Upendo works on the group project, her stomach works on digesting the brownies. Upendo digests a brownie every two (2) hours. Eight (8) hours later, when Upendo finishes her work on the group project, how many brownies does she have in her stomach?
4. In 1972 the world’s known reserves of copper were about 775 million metric tons, of which about 1.85 million metric tons are milled annually (every year) at present. Make the temporary assumption that the world population is not growing and industrializing, increasing the demand for copper exponentially, but instead is at some (unrealistic) equilibrium so that the demand for copper is constant. At the current rate of consumption, approximately how long will the known reserves last? (Hint: Increasing/decreasing the time scale, and running the model several times until you find the numbers of years after which the copper reserves drop to zero will surely help)
5. Edd, the ever-studious student, diligently does his homework. Eddy, on the other hand, is a slacker. He lets his work build up. Every week he receives seven (7) new assignments. Over the course of the week he completes one (1) or two (2) of the assignments. (On average, he completes one and a half (1.5)). The semester is twelve (12) weeks long. How many assignments does Eddy have to do at the end of the semester, right before his final exams?
6. Dexter has a pile of five (5) library books on the floor next to his desk. He loves to read. Every week Dexter returns four (4) of the books that he has read. He also checks out four (4) new books. How large is Dexter’s pile of library books after eight (8) weeks?