

## EG02041 Advanced Mathematics

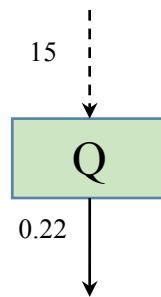
## Feedback Quiz (6): First-Order Differential Equations

Total Points: 10

Name:

ID:

**Exercise 1. Biohazards.** A mussel is placed into water polluted with polychlorinated biphenyls (PCBs). Let  $Q(t)$  be the concentration of PCB in the mussel in micrograms (per gram of tissue) after  $t$  days. For low concentrations of pollution, the mussel absorbs PCBs at the rate of 15 micrograms of PCB per gram of tissue per day. Also, the elimination rate of PCBs from the mussel is  $0.22Q$  micrograms per gram of tissue per day. Construct a differential equation for  $Q$ .



**Exercise 2. Biohazards.** Let  $Q(t)$  be as in **Exercise 1**.

- Solve for  $Q$  if no PCB is initially present in the mussel.
- For large values of  $t$ , what value does  $Q(t)$  approach?