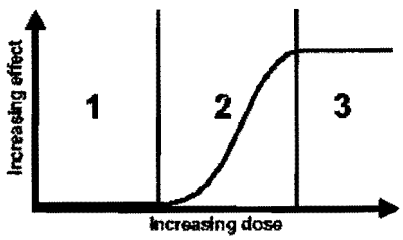
1. SDS-PAGE (sodium doecyl sulfate- polyacrylamide gel electrophoresis) is a technique widely used to separate proteins.
   (A) Please describe the role of SDS in this technique. (5%)
   (B) What will happen, if SDS is not included in this technique? (5%)

2. (A) If you put DNA into boiling water for some time, what will happen? (5%)
   (B) Then, if you move the DNA from boiling water onto ice, what will happen? (5%)
   (C) If you take the DNA out of boiling water and let it cool down slowly, what will happen then? (5%)

3. Please describe how the secondary structure of a protein will be changed when surrounded by either saline or hydrophobic solvents (e.g. DMSO). (10%)

4. Many of the proteins are produced in a form with no bioactivities and require further modifications to be activated. Describe all the possible activation mechanisms. (20%)

5. (A) Based on the following figure, please describe how to determine the EC_{50}. (5%)
   (B) Please explain the possible activities in these three phases of cellular responses. (10%)
   (C) Please describe what you can do to maintain the increase of the effect beyond phase 2 and across the phase 3. (5%)



6. Please explain the following terms:
   (A) Promoter (5%) (B) Domain (5%) (C) Apoptosis (5%) (D) ubiquitination (5%)
   (E) telomerase (5%)