(1) Describe the principle of the chromatographic method. (10%) What are the differences between gas chromatography and high-performance liquid chromatography. (10%)

(2) The chloride in seawater is traditionally measured by a AgCl titration method. Give the details of the method. (10%).

(3) Calculate the ionic strength of (a) 0.1 F KNO₃ (b) 0.1 F Na₂SO₄ (c) 0.05 F KNO₃ + 0.01 F Na₂SO₄ (30%)

(4) A moon rock was collected by Apollo XI and delivered to you. Can you give write down a systematic layout of methods and instruments describing how to measure the rare earth elements in that rock. (20%)

(5) The bottom mud in the Dan-Shuei River may contain pesticides. Describe at least one reasonable method to detect those pollutants. (20%)