請將下列各題之英文翻譯成中文，每題二十五分。共計四題

1. Two terms are widely used in discussion of reliability of data, precision and accuracy. Precision describes the reproducibility of results; that is, the agreement between the numerical values of two or more measurements that have been made in exactly the same way. Generally, the precision of experimental measurements is readily available. Several methods exist for expressing precision of a set of data, one being the deviation from the mean (or arithmetic average) value for the set. Accuracy refers to the closeness of a measurement to its true or accepted value. The accuracy of a measurement is, of course, the only criterion of its reliability. Unfortunately, accuracy can never be determined unambiguously because such a determination requires a sure knowledge of that which is being sought, namely, the true value. Consequently, at best a scientist can only estimate the accuracy of data; this estimate is generally based on past experience, analysis of standard samples, the scientific literature, and common sense. It is important to appreciate that the precision of a measurement often is not a reliable measure of its accuracy because of the existence of more than one type of error.

2. Atomic spectroscopy is based upon absorption, fluorescence, or emission of electromagnetic radiation by atoms or ions. Two regions of the spectrum yield atomic information-the ultraviolet-visible and the X-ray. Ultraviolet and visible atomic spectra are obtained by atomization, a process by which the molecular constituents of a sample are decomposed and converted to atomic particles. The emission, absorption, or fluorescence spectrum of the atomized species then serves as the basis for analysis. To the extent that molecules and complex ions are absent, atomic spectra are simple relative to molecular spectra and consist of a number of narrow, discrete lines. On the basis of the type of atomization procedure, the atomic spectroscopic methods are classified into several categories. Within the flame category are found absorption, emission, and fluorescence procedures. Electrothermal atomization has been used for absorption and fluorescence measurements but not extensively for emission work whereas the plasma sources have been applied primarily for emission and fluorescence techniques.

3. The apparent capacity of the biomass for Pb^{2+}, Cd^{2+}, and Zn^{2+} was determined at different initial metal-ion concentrations. The relationship between initial-ion concentration and biomass capacity with or without chemical modification showed that, as the initial metal-ion concentration increased, the capacity of the biomass for the metal ions also increased, The modified biomass has a better capacity to remove the metals in solution than the unmodified one. This differential behavior in sorption capacities is related to the nature of OH and SH functions. The O-atom of an OH group is never more than divalent because the second shell is limited to eight electrons, and it requires too much energy to excite an electron into s higher shell. However, S-atoms have empty d orbitals that be used for bonding, and can form four or six bonds by unpairing electrons. These sorption characteristics, thus indicate that surface saturation is dependent on the initial metal-ion concentration. This, in turn, is due to active sites taking up the available metal more quickly at low concentrations.

4. Among the environmental factors that affect the soil bacterial community, pH is one of the most important, and it has a determining role in the type of microorganisms that predominates in different soils. Although pH normally does not vary much over time in a soil, certain management practices can induce rapid changes in the soil pH. Higher microbial activities and bacterial growth rates, measured as soil respiration rate, can be expected after liming an acidic soil. Acidic soils contain potentially decomposable organic matter that becomes susceptible to microbial attack when the pH is raised. Thus, the pH increase after liming will alter two environmental factors, favoring bacteria tolerant to high pH, and favoring bacteria able to grow rapidly on the increased amount of available organic matter.