1. 請將下段文章譯成中文

Published experimental data on digestible physiology in pigs increased during the last decades as a consequence of research efforts to improve the efficiency of pig production and to find an animal model for humans. However, a large part of the experimental results cannot be fully appreciated due to an obvious lack of integration. Moreover, there seems to be an increasing gap between the knowledge acquired through recent research and the classical concepts used in animal nutrition (digestibility coefficients and other aggregated criteria). Mathematical modeling is a useful tool to integrate dispersed data and concepts and to achieve a comprehensive view of complex biological systems. Several models to predict swine growth have been proposed.

2. 閱讀下列文章後請分別說明現在營養學觀念上的改變

a. There is no fixed ‘requirements’ for dietary energy and for dietary amino acids. Birds respond to changes in dietary energy and dietary protein concentration in a variety of ways and we need good quantitative descriptions of these responses so that we can calculate optimum feeding strategies. Those optima will be affected by biological responses, which can be measured in trials, but also by the prices of inputs and output. The optimum, calculated at any one time, has no permanent validity, being affected by changes in prices and by changes in the potential performance of the birds to be fed. What we need are better models for the prediction of responses to nutrients.

b. The dynamic state of describing nutrient requirements of ruminants refers to fact that feed ingredients can affect absorbable nutrients, hence potential performance, which has a feed back on requirements. For these reasons, the subcommittee chose to present nutrient requirements in terms of evaluating rations or diets, rather than as discrete recommendations for nutrients to fulfill a given level of performance.

3. 請將下列一段英文譯成中文

Four different levels of organization—primary, secondary, tertiary, and quaternary—are distinguished in the complex three-dimensional structures of proteins. The primary structure of a polypeptide is its amino acid sequence, which is specified by the nucleotide sequence of a gene. The secondary structure of a polypeptide refers to the spatial interrelationships of the amino acids in segments of the polypeptide. The tertiary structure of a polypeptide refers to its overall folding in three-dimensional space, and the quaternary structure refers to the association of two or more polypeptides in a multimeric protein. Hemoglobin provides an excellent example of the complexity of proteins, exhibiting all four levels of structural organization.
4. Please describe (in English)
   a. the differences among veal, calf and beef
   b. the difference between tallow and lard

5. 請將下段文章譯成中文
   Milk samples for progesterone analysis can be preserved with sodium azide, potassium dichromate, or thimerosal for storage at room temperature for about 3 weeks and for several months if the milk is stored at 4-5 °C. There is a difference in progesterone content among colostrum, composite milk, and strippings because of variation in milk-fat content. This difference is less obvious when skim milk is used for the immunoassay of progesterone, but the temperature must be controlled at centrifugation since warm butterfat will absorb progesterone more readily than cold butterfat. A common recommendation for sampling of milk for analyses of progesterone is to obtain strippings after milking.

6. 請將下列英文譯成中文
   There exist in plants and animals a number of nitrogen-containing compounds which, by definition, are not proteins, i.e., they are not amino acids joined by a peptide bond. They all- are classed as nonprotein nitrogen (NPN) compounds and that is all they have in common.

   The other nonprotein compounds occurring in feeds include amides, amino acids, nitrogenous glucosides and fats, alkaloids, ammonium salts, and nitrate. Of these, the amides and the amino acids are the ones which are of major nutritional importance. They are especially abundant where growth is rapid, and thus they make up as much as one third of the total nitrogen in pasture herbage and early cut hay.

7. Please answer the questions in English after reading the following article.
   Stem cells are defined as cells that have the ability to perpetuate themselves through self-renewal and to generate mature cells of a particular tissue through differentiation. In most tissues, stem cells are rare. As a result, stem cells must be identified prospectively and purified carefully in order to study their properties.
   Although it seems reasonable to propose that each tissue arises from a tissue-specific stem cell, the rigorous identification and isolation of these somatic stem cells has been accomplished only in a few instances. For example, haematopoietic stem cells (HSCs) have been isolated from mice and humans, and have been shown to be responsible for the generation and regeneration of the blood-forming and immune (haematolymphoid) systems. Stem cells from a variety of organs might have the potential to be used for therapy in the future, but HSCs ----the vital elements in bone-marrow transplantation --- have already been used extensively in therapeutic settings. The recent discovery that bone marrow, as well as purified HSCs, can give rise to non-haematopoietic tissues suggests that these cells may have greater differentiation potential than was assumed previously.

   a. What kinds of somatic stem cells have been isolated?
   b. Only one type of stem cells could be found in one tissue. True or False? __________
   c. Please summarize this article.