

1. Explain the following terms briefly (30%)
 - a. Systems biology
 - b. Metablomics
 - c. Telomerase
 - d. Apoptosis
 - e. CpG island
 - f. Pseudogenes
 - g. RNA interference
 - h. Retroposons
 - i. Two hybrid assay
 - j. Frameshift mutation
2. Professor Linda Hung plans to use “2D gel electrophoresis and protein ID technique” to study how the SARS coronavirus infection could affect gene expression of the host cells. Please explain the possible procedures she will take to carry out this project. (10%)
3. Give an example to explain how to use the KEGG (= Kyoto Encyclopedia of Genes and Genomes) to study microbiology? (10%)
4. You are given a protein sequence of about 1,000 amino acid residues and are asked to identify repetitive sub-sequences present in the protein sequence. How are you going to do that? (10%)
5. Describe briefly the gene organization of the *lac* operon of *E. coli* and explain how it is regulated. (10%)
6. Please explain the pattern of inheritance of the following types of genetic disorders: mitochondrial; multi-factorial; sex-linked; co-dominant; gene imprinting. (10%)
7. What are single nucleotide polymorphisms (SNPs)? Please explain how SNPs can be used to identify the genes associated with a complex genetic disorder such as diabetes. (10%)
8. With what kind of evidence can you say a gene has alternatively spliced transcripts? (10%)