94學年度 生命科學院 (甲組; 結構生物學程) 碩士班入學考試

科目 微生物學 科目代碼 (0804; 1103) 共 1 頁第 1 頁 *請在試卷【答案卷】內作答

1. Explain the meaning of the following terms briefly (30%)
   - a Magnetosomes
   - b Zoonosis
   - c Psychrotroph
   - d Siderophore
   - e S-layer
   - f Two-component phosphorelay system
   - g Integrons
   - h Kirby-Bauer method
   - i Toll-like receptor
   - j Gnotobiotic animals
2. When you are investigating whether a gene in a bacterium is associated with the bacterial virulence, the so-called molecular version of Koch's Postulates is normally applied. What are Molecular Koch's Postulates? (5%)
3. You have isolated a microorganism from a hot spring near I-Lan county. How can you differentiate whether it is a protist, a member of archaea, or a eubacterium? Please describe your strategy in sufficient details. (5%)
4. Give an example to explain how to use the KEGG (= Kyoto Encyclopedia of Genes and Genomes) to study microbiology? (5%)
5. *Klebsiella pneumoniae* is a commonly isolated opportunistic pathogen that causes septicemia. Many clinical strains of *K. pneumoniae* are also an ESBL (extended spectrum of beta-lactamase)-producer and thus difficult to treat. Please explain the meaning of the underlined terms. (5%)
6. Please describe the property and life cycle of, and diseases caused by Epstein-Barr virus in details. (10%)
7. Here are the terms commonly used to describe retroviruses: provirus, long terminal repeat (LTR), gag, reverse transcription, gene therapy. Please explain why these terms are relevant to retroviruses. (10%)
8. Please describe how an Atomic Force Microscope (AFM) works. What are the possible applications of AFM in microbiology? What are the advantages and disadvantages of using it over other method? (10%)
9. *Deinococcus radiodurans* is a bacterium that exhibits strong resistance to radiation. Please propose experiments that can help to reveal the mechanisms underlying this specific phenomenon. (10%)
10. *Helicobacter pylori* is known to produce a toxin named VacA, which generates vacuoles in cytoplasm of cultured mammalian cells. Please propose a project to study this protein. (Include the title, specific aims, and tentative approaches) (10%)