

- 一. 1. Most motile bacteria move by use of flagella; describe the flagella structure and synthesis, and the mechanism of flagellar movement. (6 %)
2. Define chemotaxis; explain in a general way how bacteria are attracted to substances like nutrients while being repelled by toxic materials. (4 %)
- 二. 1. Calculate the mean growth rate and generation time of a culture that increases in the exponential phase from 5×10^2 to 1×10^8 cells in 12 hours. (5 %)
2. What are quorum sensing and quorum quenching? Describe how they occur and discuss their importance to microorganisms. (5 %)
- 三. Define substrate-level phosphorylation and oxidative phosphorylation? (5 %) By what mechanism might ATP be synthesized during oxidative phosphorylations? (5 %)
- 四. Define the following terms:
1. DNA polymerase, 2. RNA polymerase, 3. helicase, 4. topoisomerase, 5. DNA gyrase, 6. DNA ligase, 7. code degeneracy, 8. proofreading, 9. recA protein, 10. Acid-fast staining. (10 %)
- 五. 1. Discuss the principles of virus taxonomy; list some of the more important characteristics useful in classifying viruses. (5 %)
2. How might animal viruses cause cytopathic effects during cytocidal infections? Describe the possible mechanisms of host cell damage. (5 %)
- 六. 1. How to isolate the pure culture of the bacteria from the mixed culture? 2. How do you know that your purified bacteria is autotrophic or heterotrophic one? 3. How do you know it is the G (+) or G (-) and based on what kind structure that both kinds of bacteria can be distinguished in them? 4. Other than G (+) or G (-), do you have other methods to check their single species. 5. Give a suggestion for defining the new species. (10 %)
- 七. 1. Explain the following term (4 %): a. plasmids b. transduction c. conjugation and d. merozyogote
2. True or False: (6 %)
- a. Conjugation is the transfer of genes between bacteria that depends upon direct cell-cell contact mediated by F pilus.
- b. In $F^+ \times F^-$ mating the F factor remains independent of the chromosome and the donor genes were not transferred and both become F^+ and F^+
- c. Hfr mating with F^- , donor DNA can be transferred and resulting to Hfr and F^+ .
- 八. 1. What does the immunity mean? 2. What is the hapten? 3. What is the cluster of differentiation molecules? 4. What is the major histocompatibility complex? 5. What is the T cell or B cell and their major function in the living cells? (10 %)
- 九. Describe the special characteristics of the following bacteria 1. *Bacillus* 2. *Cyanobacteria* 3. *Myxobacteria* 4. *Streptomyces* 5. *Lactobacillus* 6. *Pseudomonas* 7. *E. coli* 8. *Helicobacter* 9. *Caulobacter* 10. *Vibrio* spp. (10%)
- 十. 1. What is the pacemaker enzyme? 2. What is the food-borne disease caused by the microorganism? List one example? 3. What is the biofuel and list some that can be produced by microorganism? 4. What is the lactic fermentation? 5. What is the metabolic control engineering? (10 %)