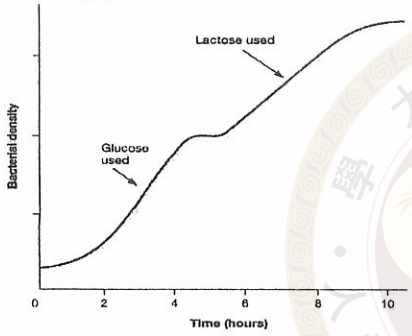
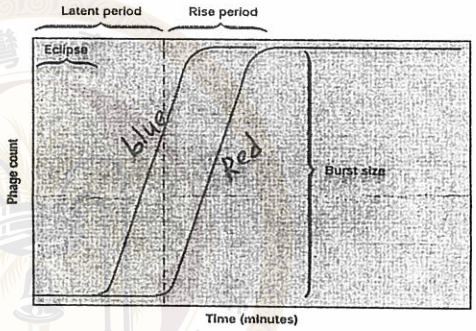
(part A) 請於試卷上依序作答，並應註明作答之部份及其題號。

1. Explain the difference between the gram negative bacteria and the gram positive bacteria, for the components of their cell walls. (5 %)
2. What are the conjugation, transformation, and the transduction? (5 %)
3. What is the transposon, the forward mutation and the reverse mutation? (3 %)
4. Ribosome has three binding sites for binding tRNAs, give the three sites and explain their roles? (6 %)
5. What is the biofilm and what would be the effects if using the UV light, antibiotics and other antimicrobial agents? (5 %)
6. What is the riboswitch, and what is its role for the gene expression? Give an example. (5 %)
7. What is the role of the telomerase? Why does the eukaryotic cell need this enzyme? (5 %)
8. (a) The growth condition for the bacterial growth, and explain the figure.
   (b) The phage growth curve, explain the blue line and the red line, eclipse period, the rise period, and the burst size? (7 %)

(a)



(b)



9. What is the operon? What is the CRP for its regulation of gene expression? (5 %)
10. What is the expression vector? What is the electroporation? (4 %)

(Part B) 請於試卷上依序作答，並應註明作答之部份及其題號。

1. What are the archaea? List the differences between archaea and bacteria as well as eucarya with respect to cell walls, cell membranes, genetics, ribosomes, and metabolism. (10%)
2. Describe the major characteristics of the genus *Chlamydia*. How do chlamydial metabolism and its life cycle differ from that of other bacteria? *C. trachomatis, C. psittaci, C. pneumoniae,* and *C. pecorum* are important pathogens of humans and other animals, which kind of diseases they caused? (10%)
3. Describe the distinctive characteristics of the following microorganisms: (a) *Campylobacter* (b) *Helicobacter* (c) *Vibrio* (d) *Neisseria* (e) *Nitrosomonas* (f) *Clostridium* (g) *Staphylococcus* (h) *Leuconostoc* (i) *Nocardia* (j) *Actinomyces* (10%)
4. What are virulence factors? How do some bacteria regulate their virulence factors? What are pathogenicity islands? What are four types of exotoxins based on their structural and physiological activities? (10%)
5. Genetic manipulations are used to produce microorganisms with new and desirable characteristics. Describe (a) protein engineering, (b) combinatorial biology, (c) metabolic pathway engineering, and how they are used in biotechnology. (6%)
6. What types of recombinant DNA techniques are being used to modify gene expression in microorganisms? (4%)

試題隨卷繳回