Microbiology Part A

1. What is the Okazaki fragments in the DNA replication **(3 pts)** and what is the major enzyme for DNA replication and DNA repair in *Escherichia coli*? **(2 pts)**
2. What is the promoter with its characteristics and functions in the gene expression? **(5 pts)**
3. Please explain each term of the conjugation, transformation, transduction and transfection **(8 pts)**
4. What is the replication of the telomeric DNA of eukaryotic chromosomes by telomerase **(5 pts)**
5. What is the stringent response in many bacteria? **(2 pts)** What is the roles of second messenger and its helper protein? **(4 pts)**
6. What are the silent mutation, missense and nonsense mutation in genetics? **(6 pts)**
7. What is the heterocyst in cyanobacteria? **(3 pts)** Is it anoxygenic or oxygenic condition and why it has to be under such condition? **(2 pts)**
8. What is the function for bacteria which belong to either methyltrophy group or methanogens? **(4 pts)**
9. What is the nitrification bacteria **(2 pts)** and no bacteria can perform both reaction and give the two representative general name for the two reactional bacteria **(2 pts)**.
10. What is the Archaea and describe its general characteristics **(2 pts)**.

Microbiology Part B

1. What is the major difference of cell wall to distinguish Gram positive from Gram negative? **(2 pts)**
2. Please explain the difference between "Sterilization" and "Disinfection". **(4 pts)**
3. (i) Explain the mechanisms by which heat, ultraviolet (UV) light, ionizing radiation and heavy metals kill microbes. **(4 pts)** (ii) List the advantages and disadvantages of these methods. **(4 pts)**
4. List 4 major mechanisms of action of antibacterial drugs. And list the name of one antibiotic in each category. **(8 pts)**
5. Please write 4 of the major electron carriers in the cells. **(4 pts)**
6. Please fill the right information in the table below **(6 pts)**

Nutritional type	Carbon Source	Energy Source	Electron source	Representative Microorganisms (List one)
Photolithoautotroph				
Photoorganoheterotroph				
Chemolithoheterotroph				

7. Please rank the order of the following reactions from the top soil. **(2 pts)**
   (i) SO_4^{2-} production (ii) NO_3^- reduction (iii) CH_4 Production (iv) O_2 Reduction
8. Please explain the microbial interactions below. **(6 pts)**
   (i) Amensalism (ii) Commensalism (iii) Mutualism
9. If you want to determine the microbiota of the human gut, how will you do? Please explain the principle of your method. **(2pts)**
10. (i) How the great variety of antibodies produced by mature B cells? **(2 pts)** (ii) And explain "Clonal selection." **(2 pts)**
11. Please explain the following terms (i) pathogenicity islands (ii) Vector-borne transmission disease **(4 pts)**

試題隨卷繳回