※注意：請於答案卷上依序作答，並註明作答之大題與小題編號。

2008 NTU Institute of Epidemiology Graduate Exam on Microbiology

A. Simple questions with simple answers (20 points)

1. What is the English whole spelling of AIDS? (2%) What is the official name of its etiological agent (please write down the full English name of this agent)? (2%)
2. Worldwide, malaria and TB are the two leading killers. What is the full English name of the etiological agent of life-threatening malaria (2%) and TB (2%), respectively?
3. Variant Creutzfeldt-Jakob disease in England is a neurodegenerative disease transmitted through eating contaminated beef or receiving transfusion with contaminated blood product. Which class of microbial agent does its etiological agent belong to? (2%)
4. What is the full English name of the spore-forming bacteria that was produced and stored as a biological weapon by Soviet Union and United States Army? (2%)
5. What is the name of the bacterial enzyme that enables bacteria to resist penicillin- and cephalosporin-classes antibiotics? (2%)
6. What is the full English name of the fungus that was the most common cause of fungal meningitis in Taiwan? (2%)
7. Dysentery with bloody diarrhea can be caused by either bacteria or protozoa. Please write down the full English name of the bacteria that cause bacillary dysentery and was a reportable disease (2%), and also write down the full English name of the protozoa that can also cause dysentery (2%).

B. Explain the following terms: (30 points)

1. Antigenic shift (in influenza virus) (5%)

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2. Antibody-dependent enhancement (ADE) (in dengue hemorrhagic fever) (5%)
3. Highly pathogenic avian influenza (HPAI) virus (5%)
4. Highly active antiretroviral therapy (HAART) (for HIV virus) (5%)
5. *Extensively drug-resistant TB (XDR-TB) (5%)*
6. Severe acute respiratory syndrome (SARS) (5%)

C. Thinking questions: (50%)

1. In a chest X-ray screening in 2003, a community hospital in Taipei unexpectedly found as many as 50 its employees had active TB. The Center for Disease Control (CDC) want to investigate whether there was in-hospital transmission of TB, what kind of microbiological methods can be helpful in this situation? If the results turn out to be Yes, what kind of investigation should be done next? (8%)
2. Hospital-acquired bacterial infection continues to cause morbidity and mortality in hospitals worldwide. To combat the problem, doctors prescribed broad-spectrum antibiotics as both preventive measures and therapeutic agents. Do you think such a practice can solve the problem? Why? What kind of additional measures are possibly needed? (10%)
3. Despite intensive control effort, the annual number of dengue fever cases did not decrease in Southeast Asia region. In 2007, a large-scale dengue outbreak also occurred in Tainan. Can you propose three possible hypotheses to explain the difficulty in dengue control? How to test these hypotheses? (15%)
4. If you are an epidemiologist and are sent to investigate an outbreak of encephalitis in a developing country due to an unknown etiological agent, what are you going to do in both laboratory diagnosis and public health intervention? (17%)

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