※ 注意：請於試卷上「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

第一大題
每題 3 分

1. 黴漿菌 (*Mycoplasma*) 之細胞膜含有那一種物質是其他細菌所沒有的？
2. SOS response 是什麼？它對細菌有何重要性？
3. Penicillin 作用於細菌的那一個 pathway？
4. 解釋 Shine-Dalgarno sequence 爲何？什麼東西會和它結合？
5. 何種實驗是用來檢測 *Mycobacteria*？

第二大題

1. 請簡述五項因細菌或研究細菌對分子生物學領域的重大發現或貢獻。(5%)
2. 以大腸桿菌爲例，說明細菌染色體基因定序完成後對該菌在基礎研究及臨床診斷上的應用有哪些幫助及貢獻。(10%)

第三大題

1. 解釋名詞(各 3 分)
   ① Class switching
   ② anergy
   ③ MHC restriction
   ④ Toll like receptor
   ⑤ Affinity maturation

2. A new viral disease AIV is threatening human. You and your professor work very hard on the research of immune response in people infected with this virus and for developing vaccine. After intensive work, you were able to culture the virus and to identify the major viral protein ARD as a 36 KD protein. You also found that the ARD could induce both B and T cell response when immunize mice.
   Regarding to the epitopes recognized by B and T cells, which of the following is correct? (3 分，單選)
   ① T cell recognize a short peptide within the ARD protein but not the protein surface
   ② T cells recognize the soluble native ARD protein
   ③ B cell epitope is usually a linear continuous epitope
   ④ CD8 T cells recognize the infected cells via antigen presented by MHC class II
   ⑤ Both B and T cells can recognize ARD protein, so they recognize the same epitopes

3. 配合題: pick up the right answer from the below list (單選，共 12 分)

_____ ① TAP	_____ ② DM
_____ ③ PGYAVEDGGMLL peptide	_____ ④ hypermutation
_____ ⑤ CLIP	_____ ⑥RAG-1

(A) MHC class I antigen presentation
(B) MHC class II antigen presentation
(C) Both MHC class I and II antigen presentation
(D) antigen binding sites in T cell receptor (TCR)
(E) NK cell receptor
(F) Initiate the cutting of recombination sequence-specific DNA cleavage during Ig gene rearrangement
(G) affinity maturation
(H) generation of memory cells
(I) Class switching

見背面

第四大題

簡答題：

1. What type of genome do most DNA viruses contain? What is the exception (give the name of one DNA virus)? (2%)
2. What type of genome do most RNA viruses contain? What is the exception (give the name of one RNA virus)? (2%)
3. What are prions? What diseases are caused by prions (give one example)? (3%)
4. What are the two main mechanisms by which viruses penetrate into cells? (2%)
5. Where do most DNA viruses replicate? What family of DNA viruses is the exception? (4%)
6. Where do most RNA viruses replicate? What RNA viruses are the exceptions (give one example)? (4%)
7. The - ssRNA viruses use different strategy to replicate their genomes than +ssRNA viruses. How do - ssRNA viruses replicate their genomes? (3%)
8. Many oncogenic DNA viruses encode proteins that inactivate tumor suppressors such as p53 and RB. Why do these viruses need to encode proteins that inactivate p53 and RB? (4%)

第五大題

簡答題：每題二分

1. 病毒感染產生疾病的原因
2. (+) sense RNA 病毒所產生之 polyproteins 由那些酵素負責切割
3. Tamiflu®(克流感)之作用機制
4. SARS coronavirus 之傳染途徑
5. C 型肝炎病毒主要傳染途徑
6. 指出三種與癌症發生有關之病毒
7. 日本腦炎的主要媒介生物(vector)及保毒生物(reservoir)
8. Fifth disease 是由那種病毒感染所引起

試題隨卷繳回