

國立中山大學八十八學年度碩博士班招生考試試題

科目：遺傳及分子生物學(生物醫學科學研究所碩士班)

共 / 頁 第 / 頁

1. How is the sex determined in human and *Drosophila*? (10%)
2. A girl has blood type O; her father has type AB and mother type O. Is she an adopted child? Explain your answer. (10%)
3. How do gene and genome organization differ in prokaryotes and eukaryotes? (20%)
4. How are antibodies synthesized from their genes? (20%)
5. Contrast the following terms:
- | | |
|---|-------|
| Paracentric vs pericentric inversion | (10%) |
| Maternal inheritance vs maternal effect | (10%) |
| Transformation vs transduction | (10%) |
| Attenuator vs repressor | (10%) |

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科目：動物生理及生物化學(生物醫學科學研究所碩士班) 共 / 頁 第 / 頁

1. The blood clotting mechanism involves a series of reactions in a cascade that ends with the formation of a fibrin clot. Please describe the activation of intrinsic pathway and explain how it leads to fibrin formation. [10%]
2. The nephrons consist of mainly four subunits : the renal corpuscle, the proximal tubules, the loop of Henle and the distal tubules. Explain how are they organized and functioned. [10%]
3. Compare the action mechanisms for steroid and peptide hormones with examples and diagrams. [10%]
4. Thermozymes are thermostable enzymes that function optimally between 60°C and 125°C. Most protein-stabilizing mechanisms such as [1] hydrophobic interaction [2] packing efficiency [3] disulfide bonds and [4] hydrogen bonds, have been identified by stability studies. Please explain how the four mechanisms may contribute to protein thermal stability. [10%]
5. The active transport of some sugars is coupled to their phosphorylation. Please use the best known phosphotransferase system (PTS) as an example to explain the distinctive features of group translocation. [10%]
6. What are the three major differences between enzymatic reactions and chemical reactions. [10%]
7. Explain the followings [5% each, 40% total]
[1] norepinephrine [2] actin [3] rhodopsin [4] polysynaptic reflex [5] peptidoglycan
[6] Bence-Jones protein [7] DNA gyrase [8] aminoacyl tRNA transferase.