國立中山大學100學年度博士班招生考試試題

科目：生物科學（生科系）　　共2頁第1頁

問答題：每位考生必須回答規定的五題問題：（每題20分）

甲組考生－必須回答01至04題，外加其餘題目中之任何一題（其餘題目作答超過一題者，以得分最低的一題計算成績）

乙組考生－必須回答05至08題，外加其餘題目中之任何一題（其餘題目作答超過一題者，以得分最低的一題計算成績）

丙組考生－必須回答09至12題，外加其餘題目中之任何一題（其餘題目作答超過一題者，以得分最低的一題計算成績）

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01. In mammals, the CNS axon grows over long distances to make their connections with other neurons early in development. However, CNS neurons lost their regenerative ability in adulthood. Describe all possible mechanisms related to the failure in CNS neuronal regeneration while injury or aging happened.

02. What's the role of ANP (atrial natriuretic peptide) and renin-angiotensin-system in the regulation of blood pressure?

03. List eight ways in which the effectiveness of synapse may be altered.

04. Describe the sequence of events leading to platelet activation and aggregation, and the formation of a platelet plug. What's the role of PDGF in wound healing?

05. The specific function of a particular protein is normally determined by its overall three-dimensional structure. (1) Describe the four levels of protein structure. (2) Discuss what determines the three-dimensional structure of a protein.

06. Describe the stages of cellular respiration in detail using complete oxidation of glucose as the example.

07. Describe the structure of the lac operon in E. coli and the function of the operon when (1) lactose is not present, (2) only lactose is present, and (3) both lactose and glucose are available.

08. Define the following terms:
    (1) teleomere
    (2) ribozyme
    (3) polymerase chain reaction (PCR)
    (4) RNA interference
    (5) ubiquitination of proteins

09. Describes reproductive isolation mechanisms.

10. What is biodiversity and why is it important?

11. What is r/K selection theory?

12. Terrestrial ecosystems can be grouped into broad categories called biomes. How temperature and precipitation affect the distribution of biomes.

解釋名詞: (40%)

1. telomere (4%)
2. histone (4%)
3. ubiquitin (4%)
4. ribozyme (4%)
5. membrane depolarization (4%)
6. agonist (4%)
7. cell cycle (4%)
8. apoptosis (4%)
9. miRNA (4%)
10. phospholipase C (4%)

問答題: (60%)

1. What are the 5 major families of molecules required in order to synthesize proteins? (10%)

2. In nuclear transport system, describe how proteins are transport in and out of cell nucleus. (10%)

3. Describe at least 3 major eukaryotic cell pre-mRNA processing mechanisms. (10%)

4. Epidermal growth factor (EGF) is a tyrosine kinase receptor which plays major role of cell proliferation. Describe the molecular events required for the activating process from ligand to transcription activator. (10%)

5. Describe 3 types of adhesive structures whose primary job is to hold cells together. (10%)

6. List and describe the 4 major chemical families of hormones. (10%)