

國立中央大學 105 學年度碩士班考試入學試題

所別： 物理學系生物物理 碩士班 不分組(一般生)

共 頁 第 頁

科目： 普通生物

本科考試禁用計算器

*請在答案卷(卡)內作答

問答題

1. (20 分) The chemical compositions of cells
Sugars, Fatty Acids, Amino Acids, and Nucleotides, are four families of small organic molecules in cells.
(1) Please write down the macromolecules built from these four types of molecules.
(2) Please write down the main functions of these macromolecules as many as you can.

2. (20 分) The water
(1) Please estimate how much water (by weight) in a bacterial cell. Hint: the length of a bacterium is about $2\ \mu\text{m}$ ($10^{-6}\ \text{m}$).
(2) Please estimate how many water molecules in a bacterial cell.

3. (20 分) Energy
(1). Please describe the metabolism of a cell.
(2). After eating a bowl of rice, how does your body save the energy in the molecular level? A bowl of rice contains 150 kcal (kilo calories).

4. (20 分) Life depends on the ability of cells to store, retrieve, and translate the genetic instructions required to make and maintain a living organism. Please describe how a cell passes the hereditary information to its daughter cells at cell division.

5. (20 分) In your opinion, what is the most important biological scientific instrument? Please write your reason and the principle of the instrument.