

# 國立彰化師範大學 97 學年度博士班招生考試試題

系所：科學教育研究所

組別：丁組

科目：基礎生物

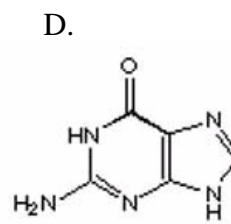
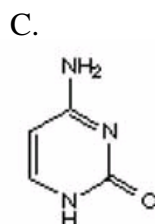
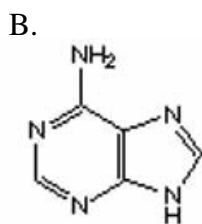
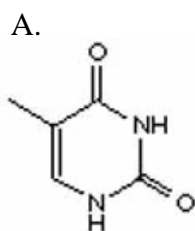
☆☆請在答案紙上作答☆☆

共 4 頁，第 1 頁

## 一、單選題：共 10 題、每題 3 分，共 30 分

1. The number of vertebrae in a vertebral column, or the number of joints in a digit (such as a finger) are all strongly influenced by \_\_\_\_\_ genes.  
A. Dall  
B. Diploid  
C. Hox  
D. Muon
2. What are the monomers of proteins?  
A. amino acids  
B. nucleotides  
C. peptides  
D. hormones
3. Behavior that reduces an individual's fitness while increasing the fitness of another individual.  
A. alternative  
B. altruism  
C. cooperation  
D. inhibitor
4. The period in the cell cycle when the cell is not dividing. During this phase, cellular metabolic activity is high, chromosomes and organelles are duplicated, and cell size may increase.  
A. anaphase  
B. interphase  
C. mitotic phase  
D. telophase

5. Which image is the Thymine chemical structure?



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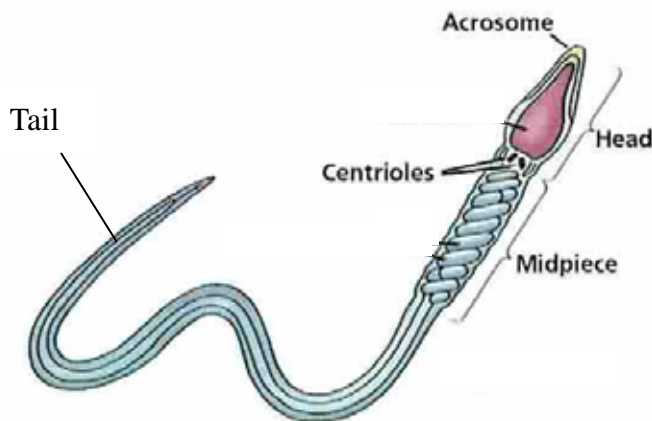
共 4 頁，第 2 頁

6. What is the correct step for nucleotide excision repair?
- a. A nuclease enzyme cuts the damaged DNA stand at two points and the damaged section is removed.
  - b. A thymine dimer distorts the DNA molecule.
  - c. Repair synthesis by a DNA polymerase fills in the missing nucleotides.
  - d. DNA ligase seals the free end of the new DNA to the old DNA, making the strand complete.

- A. a → b → c → d
- B. b → a → c → d
- C. a → c → b → d
- D. c → a → b → d

7. Which site does it contain the mitochondrias?

- A. acrosome
- B. centrioles
- C. midpiece
- D. tail



8. Portions of the frontal and temporal lobes, including Broca's area and Wernicke's area, are essential for \_\_\_\_\_.
- A. emotions
  - B. generating and understanding language
  - C. long-term memory
  - D. short-term memory

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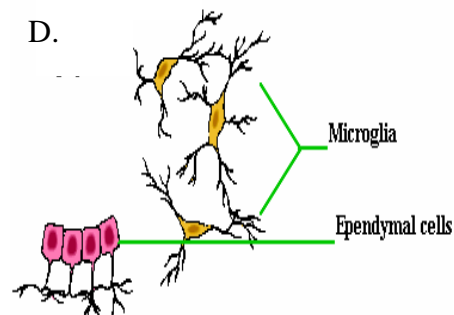
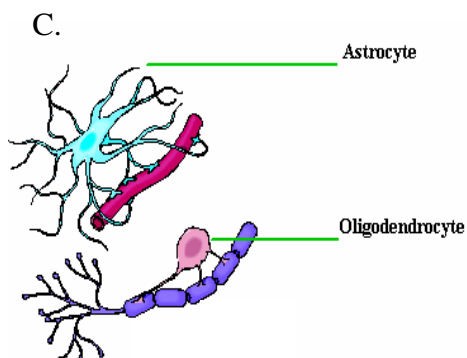
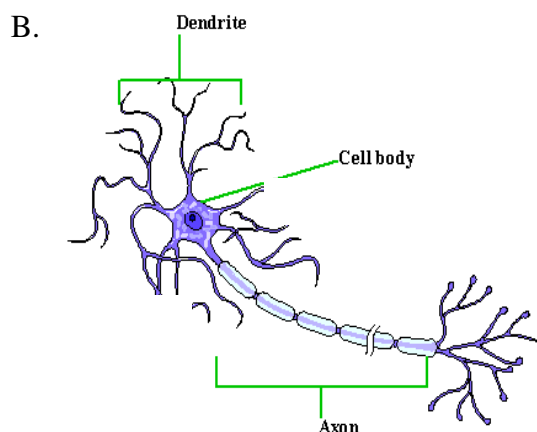
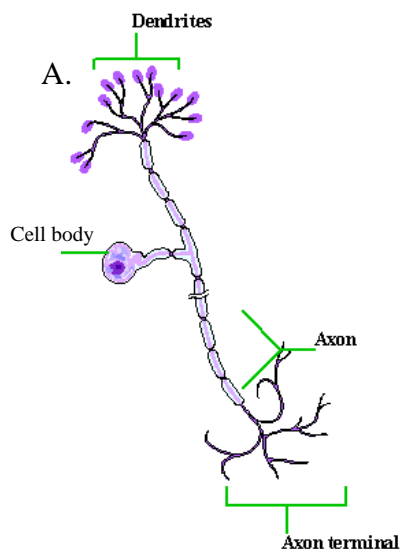
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9. Which type is the motor neuron by functional classification?



10. Which is the fewest type of white blood cells ?

- A. basophils
- B. eosinophils
- C. monocytes
- D. neutrophils

二、解釋名詞：共 20 分

1. Ecological footprint (10 分)
2. Polymerase Chain Reaction (PCR) (10 分)

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## 三、請回答下列問題：共 50 分

1. 試問粒腺體應如何分離？如何確認分離出的是粒腺體？細胞有氧呼吸的位置（或途徑）在何處？能量的形成分別為多少？粒腺體與葉綠體的 ATP 合成機制有何異同？（20 分）
2. 請簡述綠藻與洋菇的世代交替，並說明在演化上的意義。（10 分）
3. 植物向光性（phototropism）與向地性（gravitropism）的作用機制有何異同？試討論之。（10 分）
4. 何謂 apoplast pathway 與 symplast pathway？並藉此說明植物根部水份與礦物鹽由土壤進入維管束的途徑。（10 分）