國立彰化師範大學 98 學年度碩士班招生考試試題

系所：生物學系　　組別：甲、乙、丙　　科目：普通生物學(一)

☆☆請在答案紙上作答☆☆　　

一、解釋名詞：(每小題 2 分，合計 20 分)

1. alternative RNA splicing
2. wobble
3. signal peptide
4. Nonsense mutations
5. heterochromatin
6. epigenetic inheritance
7. maternal effect gene
8. totipotent
9. genetically modified organisms
10. Single nucleotide polymorphisms

二、問答題：Describe the process of DNA replication.（5 分）

三、選擇題：(每小題 2 分，合計 10 分)

1. Which four elements make up approximately 96% of living matter?
   A) carbon, sodium, chlorine, nitrogen
   B) carbon, sulfur, phosphorus, hydrogen
   C) oxygen, hydrogen, calcium, sodium
   D) carbon, hydrogen, nitrogen, oxygen
   E) carbon, oxygen, sulfur, calcium

2. Of the following functions, the major purpose of RNA is to
   A) transmit genetic information to offspring.
   B) function in the synthesis of protein.
   C) make a copy of itself, thus ensuring genetic continuity.
   D) act as a pattern or blueprint to form DNA.
   E) form the genes of higher organisms.

3. Triacylglycerol is a
   A) protein with tertiary structure.
   B) lipid made with three fatty acids and glycerol.
   C) lipid that makes up much of the plasma membrane.
   D) molecule formed from three alcohols by dehydration reactions.
   E) carbohydrate with three sugars joined together by glycosidic linkages.

國立彰化師範大學 98 學年度碩士班招生考試試題

系所：生物學系　　組別：甲、乙、丙　　科目：普通生物學(一)

☆☆請在答案紙上作答☆☆　　

4. The element nitrogen is present in all of the following except
   A) proteins.
   B) nucleic acids.
   C) amino acids.
   D) DNA.
   E) monosaccharides.

5. Which of the following statements best summarizes the structural differences between DNA and RNA?
   A) RNA is a protein, whereas DNA is a nucleic acid.
   B) DNA is a protein, whereas RNA is a nucleic acid.
   C) DNA nucleotides contain a different sugar than RNA nucleotides.
   D) RNA is a double helix, but DNA is single-stranded.
   E) A and D are correct.

四、填充題：(每格 3 分，合計 15 分)

1. What property of water is responsible for water transport in plants? _____
2. Which bonds must be broken for water to vaporize? _____
3. Which two functional groups are always found in amino acids?
   _____ and _____
4. Polymers of polysaccharides, fats, and proteins are all synthesized from monomers by which process? _____

五、問答題：請就 NADPH 在動植物細胞所扮演的角色說明之。(10 分)

六、問答題：請說明植物的系統防禦(systemic acquired resistance)之運作機制。(8 分)

七、問答題：請比較小麥與高粱的光合作用之差異。(7 分)

八、問答題：NCBI 網站是生物學資料最重要的網站，請說明在這個網站上可以找到哪一些資料與工具，你曾經使用過哪一些線上工具？下載過的哪一些資料？簡要說明資料搜尋與工具的使用方法。(10 分)

九、問答題：利用 β-galactosidase 的活性進行藍白篩選是細菌遺傳學與分子生物學上常用的技術，請說明這個篩選方法的原理。(10 分)

十、問答題：請各用一個句子回答下列兩個小題:(5 分)

(1)孟德爾遺傳定律中的分離律(law of segregation)中，互相分離的是什麼物件？

(2)孟德爾遺傳定律中的獨立分配律(law of independent segregation)中，又是什麼物件發生彼此獨立的分配？