

國立臺灣海洋大學一〇二學年度研究所碩士班暨碩士在職專班招生考試試題

考試科目： 生物化學

系所名稱： 食品科學系碩士班生技組、食品科學系碩士班食科組

1.答案以橫式由左至右書寫。2.請依題號順序作答。

第一部份

I. Multiple choice questions (total 30%, please choose **one** appropriate answer, 2% for each question)

1. Which of the following is a nonreducing sugar?
a. cellobiose b. trehalose c. fructose d. glucose
2. Which of the following without alpha(1,6)links?
a. glycogen b. dextran c. cellulose d. amylopectin
3. All of the following terms have the same meaning EXCEPT
a. enantiomer b. optical isomers
c. stereoisomers d. radioisomers
4. Which amino acid is actually an imino acid?
a. Ala b. Asp c. Gly d. Pro e. Trp
5. The primer for *in vivo* DNA replication is:
a. The 3' hydroxyl of the preceding Okazaki fragment.
b. A short piece of RNA.
c. A nick made in the DNA template.
d. All of these are true.
6. Which is a six-membered heterocyclic aromatic ring?
a. pyrimidine
b. purine
c. anose
d. sugar portion of DNA
e. ribonucleotide
7. Cells that contain "blue screen" plasmid that has an added gene are recognized by the following screening method:
a. Ability to grow on ampicillin.
b. Inability to grow on ampicillin.
c. The colonies have a blue color.
d. The colonies lack the blue color.
8. Degeneracy allows all of the following efficiencies in the genetic code, except:
a. More than one amino acid can bind to a tRNA.
b. Each tRNA can bind to more than one codon.
c. Fewer tRNA molecules are needed.
d. All of these are true.

9. Nucleosides contain all of the following except:
- Phosphates
 - Purines
 - Pyrimidines
 - sugars
 - All of this are found in nucleosides
10. Which of the activities of DNA Polymerase I is most important in its role of proofreading?
- Polymerase activity.
 - Ability to nick intact double stranded DNA.
 - 5' → 3' exonuclease.
 - 3' → 5' exonuclease.
11. Which of the following is the appropriate source of the DNA polymerase included in the PCR reaction mixture?
- E. coli*
 - bacteriophage T4
 - Thermus aquaticus*
 - Drosophila melanogaster*
 - Human
12. Single strand binding proteins are important for this activity:
- Prevent single-stranded DNA from rewinding.
 - Protect single-stranded DNA from enzymatic degradation.
 - Prevent double helical DNA from unwinding.
 - Prevent double helical DNA from becoming a triple helix.
 - Prevent single-stranded DNA from rewinding and protect it from enzymatic degradation.
13. This amino acid displays a free amino group in the peptide ANISH:
- A and H
 - A and N
 - A and I
 - H and N
 - H and I
14. If the free energy is negative, the process is:
- Thermodynamically unfavored
 - Reversible
 - Thermodynamically favored
 - At equilibrium
15. Advantages of the Polymerase Chain Reaction include all of these, **except**:
- The reaction is specific for certain sequences in the DNA.
 - Only small amounts of template are needed.
 - Results can be obtained with DNA that is old or partially degraded.
 - All the products from a specific part of the DNA will be the same size.
 - All of these are advantages of PCR.
- II. As a useful cloning vector, the plasmid must contain three important sites (or elements).
What are those sites and the meanings for their existence? (6%)
- III. Please translate the following sentences. (10%)
Enzymes (human, plant, and bacterial) are often targets for drug and other beneficial agents. Transition-state analogs (TSAs), with very high affinities for their enzyme-binding sites, often make ideal enzyme inhibitors, and TSAs have become ubiquitous therapeutic agents that improve the lives of millions of people.
- IV. How do DNA gyrases and helicases differ in their respective functions and modes of action? (4%)

第二部份

名詞解釋 30 points: (3 points for each)

1. Crotonase
2. Oligomycin
3. Neuropeptide Y
4. Arachidonic acid
5. Ganglioside
6. Glycerophosphate shuttle
7. Chylomicron
8. Glucagon
9. CoQ-Cytochrome c Reductase
10. Cardiolipin

請舉 2 例說明 20 points: (2 points for each)

1. Lipid-anchored membrane proteins
2. ATPase
3. Eicosanoids
4. Ionophores
5. Facilitated diffusion
6. Polyunsaturated fatty acids
7. Bile salts
8. Chaperones
9. Essential fatty acids
10. Glycerophospholipid