

系所組別： 口腔醫學研究所甲組

考試科目： 生物化學

考試日期：0308，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

(一)、選擇題，每題 3 分，共 60 分，所有考題務必在答案卷上作答。

1. Which of the following tripeptides would be most likely to be soluble in a hydrophobic solution like phosphate buffer?
 - A) N - phenylalanine- alanine-glycine-C
 - B) N - leucine - alanine - lysine - C
 - C) N - proline - phenylalanine - leucine - C
 - D) N - arginine - lysine - proline - C
 - E) N - glutamate - aspartate - glycine - C
2. Which property below is **not** a characteristic of enzymes?
 - A) They are required only in large amounts.
 - B) They can be altered reversibly during a reaction.
 - C) They do not alter the ΔG of a reaction.
 - D) They are used over and over again.
 - E) They do not determine whether a reaction is exergonic or endergonic.
3. What kind of interaction is **not** involved in the binding of a substrate to a normally functioning enzyme?
 - A) H bonds
 - B) a transient covalent bond
 - C) ionic bonds
 - D) a permanent covalent bond
 - E) hydrophobic interactions
4. Doubling the concentration of enzyme will _____ the V_{max} and _____ the K_M .
 - A) double, not alter
 - B) not alter, double
 - C) double, double
 - D) not change, not alter
 - E) halve, halve
5. Glycolysis occurs in the _____; the Krebs (TCA) cycle occurs in the _____ of eukaryotes and the _____ of prokaryotes.
 - A) cytoplasm, cytoplasm, cytoplasm
 - B) mitochondria, cytoplasm, mitochondria
 - C) cytoplasm, mitochondria, photosynthesis
 - D) cytoplasm, mitochondria, cytoplasm
 - E) cytoplasm, mitochondria, mitochondria
6. What residues in proteins are common sites of phosphorylation?
 - A) Serine, Histidine, Tyrosine
 - B) Serine, Threonine, Tyrosine
 - C) Serine, Lysine, Aspartate
 - D) Serine, Threonine, Tyrosine
 - E) all of the above

(背面仍有題目,請繼續作答)

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7. In what form do mRNAs and rRNAs usually move from the nucleus to the cytoplasm?
- A) as denatured molecules
 - B) as compacted molecules
 - C) as ribonucleoproteins
 - D) complexed with lipids
 - E) as linear molecules
8. The temperature at which a lipid bilayer shifts from a fluid state to a crystalline gel is called the _____.
- A) pH optimum
 - B) transition temperature
 - C) gelation temperature
 - D) transition series
 - E) temperature optimum
9. How does the transport mechanism for mRNAs ensure that only mature mRNAs can be transported to the cytoplasm?
- A) mRNAs with unspliced introns are retained in the nucleus.
 - B) mRNAs with a poly(A) tail are retained in the nucleus.
 - C) mRNAs without the full 5'-methylguanosine are stabilized.
 - D) Aly attaches only to incompletely processed mRNAs.
 - E) all of the above
10. Which of the following is a DNA nucleotide?
- A) a phosphate group, adenine and ribose
 - B) a phosphate group, guanine and deoxyribose
 - C) cytosine and ribose
 - D) thymine and deoxyribose
 - E) a phosphate group and adenine
11. Which of the following is a RNA nucleoside?
- A) a phosphate group, adenine and ribose
 - B) a phosphate group, guanine and deoxyribose
 - C) thymine and deoxyribose
 - D) cytosine and ribose
 - E) a phosphate group and adenine
12. You isolate DNA from a particular organism and analyze it. The amount of adenine was 6 mmoles and the A+T/G+C ratio is 4.0. How much guanine should be in the sample?
- A) 12 mmoles
 - B) 6 mmoles
 - C) 4 mmoles
 - D) 3 mmoles
 - E) 1.5 mmoles

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13. How much thymine would be found in the sample mentioned in question number 12?
- A) 12 mmoles
 - B) 6 mmoles
 - C) 4 mmoles
 - D) 3 mmoles
 - E) 1.5 mmoles
14. What technique supplied the data that led Watson and Crick to the double helical structure of DNA?
- A) sucrose density centrifugation
 - B) polyacrylamide gel electrophoresis
 - C) X-ray diffraction/crystallography
 - D) autoradiography
 - E) ion exchange chromatography
15. DNA binding proteins often can read the sequence of nucleotides along the DNA without having to separate the chains. How do they do this?
- A) The conformations of the phosphate groups reflect the DNA sequence.
 - B) The conformations of the deoxyribose sugars reflect the DNA sequence.
 - C) The DNA binding proteins often contain domains that fit into the DNA grooves.
 - D) The conformations of the ribose sugars reflect the DNA sequence.
 - E) all of the above
16. The unique content of the genetic information in an organism, which is essentially equivalent to all of the genetic information present in a single set of chromosomes, is known as the _____.
- A) exons
 - B) introns
 - C) consensus sequences
 - D) genome
 - E) nucleosome
17. The greatest similarities among codons specifying the same amino acid occur _____.
- A) in the first two nucleotides of the triplet
 - B) in the last two nucleotides of the triplet
 - C) in the first and third nucleotides of the triplet
 - D) in the third nucleotide of the triplet
 - E) in the middle nucleotide of the triplet
18. Which of the following is **not** required for protein synthesis?
- A) All of the various tRNAs with their attached amino acids
 - B) Ribosomes
 - C) mRNA
 - D) GTP
 - E) None of the above

(背面仍有題目,請繼續作答)

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19. What is the name of the enzyme that forms the peptide bond and of what is the enzyme composed?
- A) peptidase, RNA
 - B) peptidase, protein
 - C) peptidyl transferase, RNA
 - D) peptidyl transferase, protein
 - E) peptidyl transferase, polypeptide
20. You attempt deletion mapping of a part of the promoter region of a particular gene. You remove a short sequence of nucleotides. Once the altered DNA is transfected into cells, the cells are able to transcribe the transfected DNA in a normal fashion. What do you conclude?
- A) The sequence that was removed is an essential part of the promoter.
 - B) The sequence that was removed is not an essential part of the promoter.
 - C) The sequence that was deleted is an important determinant of the ability to transcribe the gene.
 - D) The deleted sequence has a moderate level of importance in promoting transcription.
 - E) None of the above

(二)、解釋下列名詞，每題 5 分，共 25 分，所有考題務必在答案卷上作答。

1. Telomere
2. RNA interference (RNAi)
3. Posttranslational modification
4. Apoptosis
5. Micro RNAs (miRNAs)

(三)、回答下列問題，所有考題務必在答案卷上作答。

1. The lipid bilayer serves as the foundation of every biomembrane. What two important properties does the bilayer structure provide for biomembrane function? (6%)
2. Scientists usually study a gene's function by knowing **where**, **when**, and **how** the gene is expressed. Please write down the techniques that you will use to collect information to answer the **where**, **when**, and **how** questions for gene expressions. (9%)