

臺中健康暨管理學院

九十四學年度大學部轉學招生考試試題紙

學系別	考試科目	考試日期	時 間	備 註
生物科技與生物資訊學系(生物科技組) 三年級	生物化學	94.7.30	10:20-12:00	

一、選擇題 (每題 3 分，共 60 分)

1. All are characteristic of allosteric enzymes EXCEPT:
 - a. Effectors may show stimulatory or inhibitory activity
 - b. They have multiple subunits
 - c. They obey Michaelis-Menten kinetics
 - d. The regulatory effect is by altering conformation and interaction of subunits
 - e. Binding one subunit impacts binding of substrate to other subunits

2. What is the nucleotide sequence of the DNA strand that is complementary to 5'-ATCGCAACTGTCACTA-3'?
 - a. 5'-TAGCGTTGACAGTGAT-3'
 - b. 5'-UAGUGACAGUUGCGAU-3'
 - c. 5'-TAGTGACAGTTGCGAT-3'
 - d. 5'-ATCACTGTCAACGCTA-3'

3. _____ carries long-chain fatty acyl groups across the _____ membrane.
 - a. Biotin; intestinal
 - b. Carnitine; plasma
 - c. CoA-SH; plasma
 - d. Carnitine; inner mitochondrial
 - e. TPP; outer mitochondrial

4. The genetic code is said to be degenerate, which means that:
 - a. Each codon codes for more than one amino acid
 - b. An anticodon can interact with more than one codon in the mRNA in which the codon may differ in any or all of the three nucleotides
 - c. Most amino acids are coded for by more than one codon
 - d. The code is universally used by virtually all species
 - e. None are true

5. Enzymes have active sites which have the greatest complementarity to the:
 - a. substrate b. transition state
 - c. product d. both substrate and product
 - e. none of these choices

6. Removal of RNA primer and replacement with DNA is carried out by:
 - a. DNA polymerase I b. DNA gyrase
 - c. DNA polymerase III d. DNA ligase
 - e. primase

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7. How many NAD^+ are reduced in the β -oxidation of stearoyl-CoA to form nine molecules of acetyl-CoA?

- a. 18 b. 16
- c. 12 d. 9
- e. 8

8. The strand of dsDNA that is read by RNA polymerase is termed the _____ strand with RNA polymerase moving _____ along it making _____ growing in the _____ direction.

- a. template; $5' \rightarrow 3'$; transcript; $3' \rightarrow 5'$
- b. template; $3' \rightarrow 5'$; transcript; $5' \rightarrow 3'$
- c. transcript; $3' \rightarrow 5'$; template; $5' \rightarrow 3'$
- d. nontemplate; $5' \rightarrow 3'$; template; $3' \rightarrow 5'$
- e. nontemplate; $3' \rightarrow 5'$; template; $5' \rightarrow 3'$

9. How many NADH molecules are produced in the TCA cycle per molecule of acetyl-CoA oxidized?

- a. 1 b. 2
- c. 3 d. 4
- e. 5

10. All of the statements about the classification of these amino acids are correct EXCEPT:

- a. Aspartic acid and asparagine are acidic amino acids
- b. Alanine and valine are neutral, nonpolar amino acids
- c. Serine and glutamine are polar, uncharged amino acids
- d. Lysine and arginine are basic amino acids
- e. Tyrosine and phenylalanine are aromatic amino acids

11. What is the overall net charge on the peptide lys-lys-ser-glu at pH 7.0?

- a. +2 b. +1
- c. 0 d. -1
- e. -2

12. The *lac repressor* is an example of a(n):

- a. enzyme
- b. regulatory protein
- c. transport protein
- d. storage protein
- e. structural protein

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13. Secondary and higher orders of structure are determined by all EXCEPT: - hydrophobic interactions - ionic bonds - van der Waals forces - hydrogen bonds - peptide bonds 14. Tertiary structure is defined as: - the sequence of amino acids - the folding of a single polypeptide chain in three-dimensional space - hydrogen bonding interactions between adjacent amino acid residues into helical or pleated segments - the way in which separate folded monomeric protein subunits associate to form oligomeric proteins - all are true 15. Which of the following disaccharides contains an α (1 $\rightarrow$ 4) O-glycosidic bond? - sucrose - lactose - maltose - cellobiose - cellulose 16. When binding one equivalent of S to an allosteric protein enhances the binding of additional equivalents of S to the same protein molecule, it is termed a(n): - negative heterotropic effector. - positive homotropic effector. - positive heterotropic effector. - negative homotropic effector. - none of these choices. 17. For phosphofructokinase-1: - Low ATP stimulates the enzyme, but fructose-2,6-bisphosphate inhibits. - High ATP stimulates the enzyme, and fructose-2,6-bisphosphate activates. - High ATP stimulates the enzyme, but fructose-2,6-bisphosphate inhibits. - The enzyme is more active at low ATP than at high, and fructose-2,6-bisphosphate activates the enzyme. - ATP and fructose-2,6-bisphosphate both inhibit the enzyme.				

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18. In eukaryotic cells, glycolysis occurs in the _____, and the TCA cycle reactions take place in _____.

- mitochondria; mitochondria
- cytoplasm; mitochondria
- cytoplasm; cytoplasm
- mitochondria; ribosomes
- cytoplasm; ribosomes

19. All are components of the *lac* operon EXCEPT:

- the structural genes for *lacZ*, *lacY* and *lacA*
- the operator and promoter sequences
- lacI* gene
- promoter for the *lacI* gene
- all are correct

20. Within the _____ are two consensus sequence elements, the _____ near -10 and a sequence of TATAAT, and the _____ containing the consensus TTGACA.

- termination sequence; rho subunit; sigma sub
- termination sequence; Pribnow box; sigma subunit unit
- promoter sequence; rho subunit; Pribnow box
- promoter sequence; Pribnow box; -35 region
- promoter sequence; rho subunit; -35 region

二、解釋名詞（20 分）

- complementary DNA (cDNA)
- TATA box
- homotropic
- Shine-Dalgarno sequence
- glycosis

三、問答題（20 分）

- 試舉例說明蛋白質分子內或分子間的四種非共價鍵作用力(noncovalent bond interactions)。(10 %)
- 列出轉錄作用後RNA修飾的一些方式。(10 %)