

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Part I : 50%

A. Each question below contains four suggested answers. Choose the one best response to each question. (20%)

1. Which of the statements below are true for isoenzymes?
 - (a) They have the same quaternary structure.
 - (b) They catalyze the same chemical reactions.
 - (c) They have the same distribution in organs and tissues.
 - (d) They have the different enzyme classification name and number.

2. Which of the following statements about cellulose is false?
 - (a) It is a homopolymer of D-glucose units.
 - (b) Glucose units are linked by β (1 \rightarrow 4) glycosidic bonds.
 - (c) Animals store cellulose in cells for use as an energy molecule.
 - (d) The cellulose structure is stabilized by intramolecular hydrogen bonds.

3. Which are important molecules in energy metabolism?
 - (a) Terpenes
 - (b) Cerebrosides
 - (c) Triacylglycerols
 - (d) Glycerophospholipids

4. Which of the following base sequences are probably not recognition sites for cleavage by restriction endonucleases?
 - (a) 5' CAATTG 3'
 - (b) 5' CATATG 3'
 - (c) 5' CATTAG 3'
 - (d) 5' GAATTC 3'

5. Select an amino acid from the list below that has a polar, uncharged side chain at pH 7.0.
 - (a) Aspartate
 - (b) Lysine
 - (c) Proline
 - (d) Serine

6. The word "translation" describes which of the following steps in the flow of genetic information?
 - (a) DNA \rightarrow DNA

- (b) DNA → RNA
- (c) RNA → protein
- (d) RNA → RNA

7. What kind of chemical reactivity best describes the action of DNA ligase?

- (a) DNA ligase is a polymerase.
- (b) DNA ligase catalyzes oxidation-reduction reactions.
- (c) DNA ligase catalyzes the hydrolysis of peptide bonds.
- (d) DNA ligase catalyzes the formation of a phosphoester bond.

8. What is the cellular location of the enzymes of the citric acid cycle?

- (a) Cytoplasm
- (b) Mitochondria
- (c) Nucleus
- (d) Ribosomes

9. What is the coenzyme associated with the enzyme acetyl-CoA carboxylase?

- (a) Biotin
- (b) FAD
- (c) Heme
- (d) NADPH

10. The aminotransferases require which prosthetic group?

- (a) Biotin
- (b) NADH
- (c) Pyridoxal phosphate
- (d) Tetrahydrofolic acid

B. Define the following terms. (20%)

1. snRNPs
2. Sanger base sequencing
3. Zinc fingers
4. Glycolysis
5. Beta oxidation

C. Answers the following question. (10%)

1. Describe the major differences and similarities between electron transport in mitochondria and in chloroplasts.

Part II : 50%

A. Multiple-Choice: (44%, 4 points per each)

1. Which one of followings is correct about immunoglobulins?
 - (a) All chains are linked by hydrogen bonds
 - (b) There are two polypeptide chains
 - (c) There are three copies of each type of chain
 - (d) Characterized by heavy chain regions

2. Which one of following statements about mitochondria is incorrect?
 - (a) The outer membrane is freely permeable
 - (b) Only responsible for pyruvate oxidation
 - (c) mtDNA is linear
 - (d) has no role in apoptosis

3. Which one of followings is correct about RNA?
 - (a) Using disulfide bond pairing to fold
 - (b) Single stranded
 - (c) Donot have tertiary structure
 - (d) Only responsible for transcription

4. Which one of followings could be used to separate proteins by size?
 - (a) Ion-exchange chromatography
 - (b) Isoelectric focusing
 - (c) SDS PAGE
 - (d) Reverse-phase HPLC

5. Which one of followings is correct about transcription?
 - (a) rRNA precursors are generated in the nucleolus
 - (b) Requires primer
 - (c) RNA polymerase binds promoter DNA alone to do the transcription
 - (d) A RNA product contains A, T, G, C.

6. Which one of followings is incorrect about chaperons?
 - (a) Is needed for all folding protein
 - (b) Also recognize misfolded proteins
 - (c) Could be activated by ER stress
 - (d) Requires ATP

7. Synthesis rate of DNA could be best examined by radiolabeled on which of following?

- (a) Guanine
- (b) Thymidine
- (c) ATP
- (d) Polymerase

8. Which statement is correct?

- (a) Oxygen is required from glucose to lactate
- (b) Low GDP/GTP ratio stimulate citric acid cycle
- (c) No net NADH is produced from glucose to lactate
- (d) Pyruvate dehydrogenase involves an reversible reaction

9. Which one of followings is correct?

- (a) Gluconeogenesis is only at cytosol.
- (b) Glucagon triggers gluconeogenesis
- (c) FAD is required during gluconeogenesis
- (d) Acetyl CoA stimulates pyruvate dehydrogenase

10. Which one of followings is correct?

- (a) Cofactor for Vitamin B12 absorption is not required
- (b) Glutathione generates peroxides.
- (c) Fatty acid oxidation is reduced when hungry
- (d) Most allosteric enzymes contains more than one subunit

11. DNA replication does not require

- (a) Helicase
- (b) DNA polymerase
- (c) Polyadenylation complex
- (d) DNA ligase

B. List all the possible metabolic fates of pyruvate. (6 points)