系所組別： 口腔醫學研究所甲組

考試科目： 分子生物學

考試日期：0308，節次：3

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一、單選題：(24%)

1. Cellular respiration is the chemical opposite of photosynthesis. What is its basic chemical formula? 3%

a. 6 H2O(water) + 6 O2 (oxygen)--> C6H12O6(glucose) + 6 CO2 (carbon dioxide)

b. 6 H2O(water) + 6 CO2 (carbon dioxide) --> C6H12O6(glucose) + 6 O2 (oxygen)

c. C6H12O6(glucose) + 6 O2 (oxygen) --> 6 H2O(water) + 6 CO2 (carbon dioxide)

d. C6H12O6(glucose) + 6 CO2 (carbon dioxide) --> 6 H2O(water) + 6 O2 (oxygen)

2. Which isn't an end product of glycolysis? 3%

a. 2 NADH

b. 2 water molecules

c. 2 carbon dioxide molecules

d. 2 ATP

3. The Krebs cycle occurs within the mitochondria of a cell. Which best describes the site of the Krebs (citric acid) cycle inside the mitochondria? 3%

a. Mitochondrial matrix

b. Inner mitochondrial membrane

c. Stroma

d. Outer mitochondrial membrane

4. Before the Krebs cycle, pyruvate from glycolysis is attached to an enzyme that makes it easier to break down. Carbon dioxide is released and a molecule of NADH is formed. What name is given to the molecule that now enters the Krebs cycle? 3%

a. Phosphoglucoisomerase

b. Phosphofructokinase

c. Acetyl CoB

d. Acetyl CoA

(背面仍有題目,請繼續作答)

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5. The final step in the process of cellular respiration is the electron transport chain (ETC). What best describes the first step in the electron transport chain? 3%

a. Hydrogen ions diffuse through the membrane.

b. Energized electrons from NADH and FADH2 activate transport proteins.

c. Electrons from NADH and FADH2 bond with hydrogen ions to form water molecules.

d. Electrons in the inner membrane are energized by the Sun.

6. What is a protein kinase, and what is its role in routes of transduction of chemical signals? 3%

a. It is an enzyme that is embedded in the plasma membrane, which converts ATP in response to an extracellular signal.

b. It cleaves sugar molecules into two different three-carbon sugars: dihydroxyacetone phosphate and glyceraldehydes-3-phosphate.

c. It removes phosphate groups from proteins in a process called dephosphorylation, which in turn provides the mechanism for turning off the signal transduction pathway when the initial signal is no longer present.

d. It transfers a phosphate group from ATP to a protein, usually activating that protein.

7. Which of the following is NOT a characteristic of an enzyme? 3%

a. It speeds up the rate of a reaction

b. It raises the energy of activation (EA)

c. It isn't changed at all during the reaction

d. It only fits with one substrate

8. The sequence of one strand of DNA is: 5' ATTGCCA 3'

What is the sequence of the other strand? 3%

a. 5' TAACGGT 3'

b. 5' TGGCAAT 3'

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c. 5' ATTGCCA 3'

d. 5' UAAGCCU3 '

e. 5' UGGCAAU3 '

二、問答題：(76% plus 10% bonus)

1. Please describe and compare different forms of cell death and their mechanisms of action. 11%

2. In biology, signal transduction refers to any process by which a cell converts one kind of signal or stimulus into another. Please draw a simple illustration and describe an example of how extracellulr signals are relayed inside a cell to turn on gene expression in response. 15%

3. What is epigenic regulation of gene expression?(7%) How cells execute this function? (8%)

4. What are the sources of DNA damage? (5%)What are the major types of DNA damage? (5%) How eukaryotic cells prevent and repair these damages? (5%)

5. What is RNA interference? (10%) How they regulate gene expression? (10%)

6. What is the role of mitochondria in the scenescence (aging) of a cell or organism? (10% bonus)