

考生注意事項：所有考題務必在答案卷上作答，在問題卷上作答者不計分。

一、配合題(1-30題，每題2分，均為單選，答錯倒扣0.5分)

Questions 1 to 5, choose the one most appropriate answer for each. (2% each)

1. Sulfur-containing amino acid
 2. Smallest amino acid with hydroxyl group
 3. Aromatic amino acid
 4. Amino acid with saturated hydrocarbon side chain
 5. Largest of the basic amino acids
- A. leucine
 - B. tyrosine
 - C. cysteine
 - D. arginine
 - E. serine

Questions 6 to 10, choose the one most appropriate answer for each. (2% each)

6. Translation
 7. Palindrome
 8. Transcription
 9. A form of DNA
 10. B form of DNA
- A. reads the same forwards and backwards.
 - B. the form DNA strands take under low humidity; structures of DNA/RNA hybrids or RNA double strands.
 - C. the form expected in the aqueous environment of the cells.
 - D. messenger RNA synthesis.
 - E. conversion of genetic information into proteins

Questions 11 to 15, complete each statement with the corrected enzymes.

11. catalyzes the formation of NADH and CO_2 .
12. catalyzes the reduction of FAD to FADH_2 .

(背面仍有題目,請繼續作答)

13. catalyzes the formation of oxaloacetate.
14. catalyzes the synthesis of a high-energy compound during glycolysis.
15. catalyzes a substrate-level phosphorylation during glycolysis.
 - A. Pyruvate kinase
 - B. Isocitrate dehydrogenase
 - C. Malate dehydrogenase
 - D. Succinate dehydrogenase
 - E. Enolase

Questions 16 to 20, complete each statement with the corrected enzymes.

16. joins Okazaki fragments and other disconnected pieces of DNA together.
17. polymerizes dNTPs.
18. uses ATP to unwind double-strand DNA.
19. catalyzes supercoiling isomerization
20. removes the RNA primer from the Okazaki fragments and copies DNA.
 - A. Topoisomerase
 - B. DNA polymerase I
 - C. DNA polymerase III
 - D. DNA ligase
 - E. Helicase

Questions 21 to 25, choose the one most appropriate answer for each. (2% each)

21. steroid derivatives with detergent properties that emulsify dietary lipids in the intestine and promote fat digestion and absorption.
22. male hormones for development and maintenance of secondary sexual characteristics.
23. promote gluconeogenesis and have anti-inflammatory activity.
24. membrane component that regulates membrane fluidity.
25. required for blood clotting.
 - A. Androgens
 - B. Glucocorticoids
 - C. Bile acids
 - D. Vitamin K
 - E. Cholesterol

Questions 26 to 30, choose the precursor amino acid for each compound. (2% each)

26. GABA (γ -aminobutyric acid)

27. Serotonin

28. Histamine

29. Putrescine

30. Dopamine

- A. tyrosine
- B. glutamate
- C. histidine
- D. tryptophan
- E. ornithine

二、選擇題(31-42題，每題2分，均為單選，答錯倒扣0.5分)

Choose the one best answer (2% each)

31. A reaction will always proceed spontaneously in the cell if

- A. $\Delta G = 0$
- B. $\Delta G < 0$
- C. $\Delta G > 0$
- D. $\Delta G^\circ = 0$
- E. none of the above.

32. The major source of electrons for reductive biosynthesis is

- A. NADH.
- B. NADPH.
- C. ATP.
- D. FADH₂.
- E. None of the above.

33. Which of the following compounds is a proteoglycan?

- A. Lactose
- B. Hyaluronic acid
- C. Glycogen
- D. Mannose
- E. None of the above.

(背面仍有題目,請繼續作答)

34. Glycogen phosphorylase
- A. catalyzes the hydrolysis reaction at the nonreducing ends of glycogen.
 - B. catalyzes the phosphorolysis reaction at the nonreducing ends of glycogen.
 - C. is activated by dephosphorylation.
 - D. produces glucose-6-phosphate directly.
 - E. none of the above.
35. The major substrates for gluconeogenesis are
- A. pyruvate, lactate, all TCA intermediates, and most amino acids.
 - B. pyruvate, lactate, and fatty acids.
 - C. fatty acids and acetyl-CoA.
 - D. amino acids leucine and lysine.
 - E. none of the above.
36. Which of the following statements does NOT characterize liver glycogen?
- A. The degradation of liver glycogen can provide glucose to other tissues.
 - B. Glucose units in glycogen are linked by both β -1,4 and β -1,6-glycosidic linkages.
 - C. The degradation of glycogen is highly regulated.
 - D. The degradation and synthesis of glycogen uses different enzymes.
 - E. None of the above.
37. Galactosemia is a genetic deficiency of
- A. lactase.
 - B. a uridylyltransferase that exchanges galactose-1-phosphate for glucose on UDP-glucose.
 - C. aldolase
 - D. glucose 6-phosphate dehydrogenase.
 - E. none of the above.
38. Which of the following compounds is NOT an energy-rich compound?
- A. Phosphoenolpyruvate
 - B. 1,3-Bisphosphoglycerate
 - C. ATP
 - D. Glucose-6-phosphate
 - E. Creatine phosphate
39. The fatty acid that is described as 20:4 is
- A. arachidonic acid.
 - B. palmitic acid.
 - C. linoleic acid.
 - D. oleic acid.
 - E. none of the above.

40. K_M is

- A. the initial rate of an enzyme-catalyzed reaction.
- B. the dissociation constant of the enzyme-substrate complex.
- C. the substrate concentration at which enzyme is working at half of its maximal rate.
- D. the substrate concentration at which enzyme is working at its maximal rate.
- E. None of the above.

41. A competitive inhibitor

- A. decreases V_{max} without affecting K_M .
- B. increases V_{max} without affecting K_M .
- C. decreases K_M without affecting V_{max} .
- D. increases K_M without affecting V_{max} .
- E. decreases both K_M and V_{max} .

42. The coenzyme that participates in carboxylation reaction is

- A. coenzyme A.
- B. thiamine pyrophosphate.
- C. biotin.
- D. flavin coenzyme.
- E. none of the above.

三、選擇題(43-50題，每題2分，均為單選，答錯倒扣0.5分)

Answer the following questions using the key outlined below: (2% each)

- (A) if 1, 2, and 3 are correct
- (B) if 1 and 3 are correct
- (C) if 2 and 4 are correct
- (D) if only 4 is correct
- (E) if all four are correct

43. Which of the following molecules are products in the pentose phosphate pathway?

- 1. NADPH
- 2. ribulose 5-phosphate.
- 3. ribose 5-phosphate.
- 4. glucuronic acid.

44. Which of the following enzymes is involved in gluconeogenesis but not in glycolysis?

- 1. Pyruvate carboxylase
- 2. Fructose-1,6-bisphosphatase.
- 3. Glucose-6-phosphatase
- 4. Phosphoenolpyruvate carboxykinase

(背面仍有題目,請繼續作答)

45. Which of the following enzymes catalyzes the formation of ATP during glycolysis?
1. Phosphoglycerate kinase
 2. Enolase
 3. Pyruvate kinase
 4. Hexokinase
46. Liver 6-Phosphofructo-1-kinase is inhibited by
1. fructose-2,6-bisphosphate.
 2. ATP
 3. AMP
 4. citrate
47. Which of the following is characteristic of hemoglobin?
1. It contains a prosthetic group.
 2. It is a metalloprotein.
 3. It is a transport protein for oxygen.
 4. It is an allosteric enzyme.
48. Most globular proteins have
1. α helical regions.
 2. β sheets.
 3. random coil regions.
 4. tightly packed interiors containing hydrophobic residues.
49. Which of the following statements is true of a lipid bilayer?
1. Phospholipid molecules with charged head groups diffuse laterally across the surface of the bilayer.
 2. Phospholipid molecules with charged head groups diffuse readily from the inside to the outside across the membrane.
 3. Water diffuses readily across the membrane.
 4. Charged ions diffuse readily across the membrane.
50. Which of the following statements about the chemiosmotic hypothesis is correct?
1. Uncouplers acts by direct inhibiting F_0F_1 ATP synthase.
 2. Electron transfer in mitochondria is accompanied by the translocation of protons from the matrix to the intermembrane space.
 3. An intact inner membrane is not required for oxidative phosphorylation.
 4. The proton motive force drives protons back across the membrane via F_0F_1 ATP synthase.