

一、單選題 20% (答對每題得 1 分) ※ 注意：請於試卷內之「選擇題作答區」依序作答。

1. Each reaction in a metabolic pathway is A. reversible; B. irreversible; C. catalyzed by a specific enzyme; D. controlled by the end product
2. The function of gluconeogenesis is A. maintenance of blood glucose levels during starvation or a low carbohydrate diet; B. recovery of lactate from fermentation and glycerol from fat breakdown; C. a pathway for the utilization of amino acids; D. all of the above
3. The hormones, glucagon and epinephrine, stimulate glycogen breakdown to G-6-P A. only in the liver; B. using ATP as the phosphoryl donor; C. directly, by binding to glycogen phosphorylase; D. indirectly, by first stimulating adenylate cyclase to make cAMP
4. Which of the following compounds is responsible for coordinated regulation of glucose and glycogen metabolism? A. NAD⁺; B. Fructose 2,6 bisphosphate; C. Acetyl-CoA; D. Fructose 1,6 bisphosphate
5. Under aerobic condition pyruvate is converted by pyruvate dehydrogenase to A. phosphoenol pyruvate; B. acetyl CoA; C. lactate; D. glyceraldehyde 3 phosphate
6. What is the end product of leucine metabolism? A. Acetyl-CoA; B. Pyruvic acid; C. Oxaloacetic acid; D. Acetyl carnitine
7. Protein fluorescence arises primarily from which residue? A. Arginine; B. Tryptophan; C. Tyrosine; D. Phenylalanine
8. The α -amino acids have a carboxyl group with a pK around _____, and an amino group with a pK near _____. A. 1.1, and 12.1; B. 6.5, and 8.0; C. 3.3, and 10.5; D. 2.2, and 9.4
9. The sequence of letters 'WYQN' will represent A. Tryptophan, tyrosine, glutamic acid, asparagine; B. Tryptophan, tyrosine, glutamine, asparagine; C. Tryptophan, glutamine, tryptophan, asparagine; D. Glutamine, tyrosine, tryptophan, aspartic acid
10. Cholesterol is essential for normal membrane functions because it A. plugs up the cardiac arteries of older men; B. cannot be made by higher organisms; C. keeps membranes fluid; D. spans the thickness of the bilayer
11. Membrane lipids are A. hydrophilic; B. hydrophobic; C. amphiphilic; D. none of these

見背面

12. The smooth endoplasmic reticulum (SER) is the site of A. phospholipid synthesis; B. amino acid synthesis; C. carbohydrate synthesis; D. protein synthesis
13. Lysozymes are found in A. plant cells; B. animal cells; C. microbial cells; D. all of these
14. Vitamin B12 (Cobalamin) is only synthesized by A. fungi; B. bacteria; C. plants; D. animals
15. Selenium is an essential component of the enzyme glutathione peroxidase which A. scavenges toxic hydroperoxy compounds in tissues; B. reduces toxic hydroperoxy compounds in tissues; C. oxidizes toxic hydroperoxy compounds in tissues; D. none of the above
16. The nitrogen atoms of urea produced in the urea cycle are derived from A. nitrate; B. ammonia and aspartic acid; C. nitrite; D. ammonia
17. Which of the following is used as carbon atom source while producing urea in the urea cycle? A. Arginine; B. Aspartic acid; C. Carbon dioxide; D. Glucose
18. Self-phosphorylation is an excellent mechanism for triggering specific catalytic function of the proteins involved in signal cascades because it A. changes the shape and thus the enzymatic activity of the proteins involved; B. makes the receptor more likely to capture the signaling molecule; C. allows hydrophilic signaling molecules to cross the plasma membrane; D. None of the above
19. Nitroglycerin has long been administered to human patients suffering from chronic chest pain (angina). This medication works because it A. mimics the action of signal receptors; B. is broken down into hormones that affect the heart; C. interferes with chemical cascades that trigger contraction of heart muscle; D. breaks down into nitric oxide, which increases blood flow to the heart
20. In terms of cell communication, what do bacterial pathogens such as cholera and anthrax have in common? A. They destroy the receptors for key signaling molecules; B. They prevent the production of key signaling molecules; C. They alter the chemical structure of key signaling molecules; D. They block the normal functioning of signal transduction mechanisms

二、配合題 10%

21. Protein represent an extremely diverse set biomolecules. Match the functional class of proteins with their appropriate function 請在【答案卷】作答

接次頁

a	b	c	d	E
f	g	h	i	j

Class	Function
a membrane proteins	1 various venoms and toxins
b transport proteins	2 spherical in shape & water soluble
c storage proteins	3 associated with biological membranes
d structural proteins	4 proteins destined for an extracellular location
e protective proteins	5 certain hormones
f contractile proteins	6 certain extracellular, fibrous elements
g regulatory proteins	7 motile cellular appendages
h globular proteins	8 biological catalysis
I enzymes	9 move glucose across the cell membrane
J glycoproteins	10 source of amino acids for developing organism

三、簡答題 20% (每題 5 分)

22. Name the different major polar lipids in chloroplast thylakoid membrane, plasma membrane, and neuron cell sheath.
23. Why is photosynthesis an electron transport process? Where are electrons from? Through which are these electrons transported? What are produced in the last?
24. What will happen when ferredoxin in the electron transport is very highly reduced?
25. How does a photosynthetic organism save itself from the excess light damage?

三、詳答題 50% (每題 10 分)

26. 魚的肌肉中含有紅肉與白肉兩種類型，此兩種肉之形態與功能有何不同？
27. 魚類排泄的含氮廢物有哪幾類？以何者為主？為什麼？
28. Brown adipose tissue 為何？其功能如何運作？
29. 蛋白質的那些特性或性質可以被利用來作為分離或純化的依據？
30. 請簡述 Sanger 的 DNA 定序方法原理。