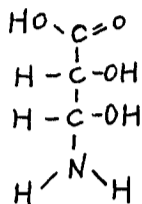


一. 填充題 (80%)

請依題號順序作答, 每格 2 分, 共 80 分。有些空格之答案須依出現順序排列, 否則不予計分。(易混淆之名詞, 請以英文作答)。  
(標明題號, 於答案紙上作答)。

1. Some weak bonds instead of strong covalent and ionic bonds play a major role in stabilizing the specific conformations of large molecules such as proteins. 3 examples of these weak bonds are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

2. Three functional groups are present in the following molecule. They are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ groups.



3. The monomer of nucleic acid is composed of three smaller molecular building blocks: a \_\_\_\_\_; a \_\_\_\_\_; and a \_\_\_\_\_.

4. One of the most common modes of metabolic control is \_\_\_\_\_, the switching-off of a metabolic pathway by its end product, which acts as an inhibitor of an enzyme within the pathway.

5. In animals, there are three main types of intercellular junctions: \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_. Through these structures, the many cells of an animal can be integrated into one functional organism.

6. The Krebs cycle is also known as \_\_\_\_\_ cycle. Most of the energy made available by the oxidative steps of the cycle is conserved as high-energy electrons in \_\_\_\_\_ molecule, which contributes to the generation of a maximum of about \_\_\_\_\_ ATPs for each molecule.

7. During the \_\_\_\_\_ stage of meiosis, crossing over may occur between homologous chromatids. The results of this event are visible in the microscope by the appearance of X-shaped regions called \_\_\_\_\_.

8. Chromosomal alterations can have significant impact on phenotype and are associated with a number of human disorders. Two main kinds of alterations are \_\_\_\_\_ and \_\_\_\_\_.

9. The transformation of bacteria and the Hershey-Chase experiments demonstrated that \_\_\_\_\_ is the genetic material of cells. This molecule adopts the \_\_\_\_\_ model of replication to distribute same copy of genetic material into each progeny cell.

10. Prokaryotes reproduce by a type of cell division called \_\_\_\_\_, meaning literally "to divide in half".
11. Lichens are highly integrated symbiotic associations of millions of \_\_\_\_\_ cells tangled in a lattice of \_\_\_\_\_ hyphae.
12. The loose connective tissue of animal is characterized by the presence of collagenous fiber, reticular fiber, elastic fiber, macrophage, and \_\_\_\_\_ cell. Adipose tissue is, however, a specialized form of loose connective tissue that stores \_\_\_\_\_ in \_\_\_\_\_ cells distributed throughout its matrix.
13. In the mammalian digestive system, pepsin is synthesized by the cells of the stomach wall and secreted in an inactive form called \_\_\_\_\_. Its subsequent activation is achieved by \_\_\_\_\_ in the gastric juice, which is secreted by different kind of cells.
14. The specific defense mechanism in the vertebrate body is classified into \_\_\_\_\_ and \_\_\_\_\_ immune responses mounted by different components of the immune system. Three characteristics of this mechanism are \_\_\_\_\_, \_\_\_\_\_, and self-tolerance.
15. The synapse is a unique junction that controls communication between neurons. In a chemical synapse, a depolarization stimulates the fusion of \_\_\_\_\_ with the presynaptic membrane and the release of \_\_\_\_\_ into the synaptic cleft.
16. Three examples of chemical cycling for some important chemical elements which are in limited supply in the global ecosystem are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
17. Complementary DNA(cDNA) is made in the laboratory by using \_\_\_\_\_ molecules as templates. Further cDNA cloning and expression in suitable host cell can help finding the gene of interest.

二. 問答題 (20%)

種明題號, 於答卷紙上作答。

18. Explain 4 characteristic improvements of the vertebrate body. (8%)
19. Describe the ways and the functions of the "portal circulation" in human. (6%)
20. Angiosperms are by far the most diverse and geographically widespread of all plants. Explain 2 remarkable angiosperm evolutions which might contribute to this phenomenon. (6%)