

第一部分

一、單選題 (每題1分，共15分) ※ 注意：請於試卷內之「選擇題作答區」依序作答。

1. The location on an enzyme to which the substrate(s) bind(s) is called the
A. affinity site. B. active site. C. determinative site. D. reaction site.
2. Mitochondrial electron transport takes place
A. on the outer mitochondrial membrane.
B. on the inner mitochondrial membrane.
C. in the fluid matrix of the mitochondria.
D. both on the inner and on the outer mitochondrial membrane.
3. The net gain of ATP per molecule of glucose metabolized aerobically in procaryotes is
A. 24. B. 32. C. 36. D. 38.
4. The synthesis of glucose from non-carbohydrate precursors is called:
A. glycolysis. B. glucolysis. C. gluconeogenesis. D. None of these.
5. Which of the following is not a phase of the Calvin Cycle?
A. carboxylation phase B. oxidation phase C. reduction phase D. regeneration phase
6. A section of DNA that codes for a protein or other functional product is called
A. codon B. gene. C. replicon. D. anticodon.
7. In metabolic channeling, the regulation of metabolic pathways is controlled by the _____ of metabolites and enzymes involved in the pathway.
A. amount B. location C. activity D. All of these.
8. Which of the following is not a mechanism for the regulation of enzyme synthesis?
A. induction B. repression C. end product inhibition D. attenuation
9. _____ inactivate repressor proteins thereby increasing the synthesis of certain enzymes.
A. Inducers B. Corepressor C. Effectors D. Modulators
10. The protein coat surrounding the viral genome is called the
A. capsule. B. capsid. C. matrix. D. Envelope
11. Which of the following function(s) as the B cell antigen receptor?
A. IgG B. monomeric IgM C. IgE D. IgA
12. Which of the following are NOT microbial primary metabolites?
A. Enzymes B. Amino acids C. Nucleotides D. Toxins
13. Which of the following is NOT correct regarding probiotics?
A. Microorganisms B. Dietary adjuvants C. Oligosaccharides D. Isolated from infants
14. After the secondary stain has been added, gram-positive organisms are stained _____ and gram-negative organisms are stained _____.
A. purple; purple B. purple; colorless C. purple; pink D. pink; pink
15. The _____ wavelength & the _____ numerical aperture, the better resolution for the microscopes.
A. smaller; smaller B. smaller; larger C. larger; smaller D. larger; larger

※ 注意：以下各題請於試卷內之「非選擇題作答區」作答，並應註明作答之題號。

二、配合題 (10分；每答對一項得1分，每答錯一項扣1分)

見背面

- | | | |
|---------------------|----------------------|-------------------|
| () 1. Commensalism | A. Ectosymbiosis | I. Syntrophism |
| () 2. Parasitism | B. Endosymbiosis | J. unidirectional |
| () 3. Mutualism | C. Spatial proximity | K. Lichens |
| () 4. Amensalism | D. Obligatory | L. Not obligatory |
- E. A fermentative bacterium and a methanogen
 F. *E. coli* lives in human colon
 G. Not dependent on the host metabolically
 H. Dependent on the host metabolically

三、請繪圖說明並比較革蘭氏陽性菌 (Gram-positive) 及陰性菌 (Gram-negative) 細胞壁構造之差異。(6分)

四、請比較有氧呼吸 (aerobic respiration)、無氧呼吸 (anaerobic respiration) 及醱酵作用 (fermentation) 之差異。(9分)

五、某生將一微生物接種至一完全不含有機質的培養基，以 CO_2 為唯一碳源，經過 7 天照光培養後長出菌體，該生因此推斷這微生物為 anaerobic photoautolithotroph。你同意該生之判斷嗎？請說明理由。(10分)

第二部分

六、微生物在產業上之傳統應用，釀酒為極重要之一部分，酒依製造性質分為哪三類？各舉例說明之。白蘭地 (brandy) 及威士忌 (whiskey) 均為蒸餾酒，兩者如何區分？(10%)

七、乳酸菌 (lactic acid bacteria, LAB) 發酵乳在國內微生物產業佔極重要地位，其一般保健功效均著重腸道菌相改善，另一值得開發的功效為降膽固醇，文獻上提及乳酸菌發酵產品降低膽固醇之機制 (mechanism) 為何？(10%)

八、微生物保健食品 (functional food) 為國內目前產值極大之產業，其中紅麴 (red mold rice) 為具有多功效之保健食品，其降血脂及降血壓的成分分別為何？其在使用上應注意哪些事項？(10%)

九、檢測食品微生物除傳統的生化檢測外，常使用快速檢測法，試敘述凝集 (agglutination) 及酵素連結免疫分析法 (enzyme linked immunoabsorbent assay, ELISA) 之原理。(10%)

十、請對國內微生物生技產業提出你的觀感。(10%)

試題隨卷繳回