

考生注意事項：所有考題務必在答案卷上作答。凡在問題卷上作答者無效

一、選擇題(均為單選，每題2分，答錯倒扣0.5分)

1. The genomic size of human is about
  - A.  $3 \times 10^8$  nucleotide pairs
  - B.  $3 \times 10^9$  nucleotide pairs
  - C.  $3 \times 10^{10}$  nucleotide pairs
  - D.  $3 \times 10^{11}$  nucleotide pairs
  - E.  $3 \times 10^{12}$  nucleotide pairs
  
2. The cell double in size during which phase of the cell cycle ?
  - A. G<sub>0</sub>
  - B. G<sub>1</sub>
  - C. S
  - D. G<sub>2</sub>
  - E. M
  
3. A muscle cell is a muscle
  - A. bundle
  - B. fiber
  - C. fibril
  - D. filament
  - E. band
  
4. Which of the following are eukaryotes ?
  - A. Viruses, Bacteria
  - B. Amoebae, Blue-green algae
  - C. Fungi, Protozoa
  - D. Blue-green algae, Protozoa
  - E. Fungi, Bacteria
  
5. In the cell, myosine light-chain kinase is regulated by the concentration of
  - A. Sodium ions
  - B. Calcium ions
  - C. Creatine phosphate
  - D. Potassium ions
  - E. Magnesium ions
  
6. Which of the following compounds is NOT a neurotransmitters ?
  - A. Dopamine
  - B. Histamine
  - C. Serotonin
  - D. Acetylcholine
  - E. Eserine
  
7. Which of the following statements concerning plasmid is INCORRECT ?
  - A. They are replicon stably inherited in an extrachromosomal state.

- B. They are widely distributed throughout the prokaryotes and are generally dispensable.
- C. They are single stranded DNA molecules.
- D. Most plasmid contains multiple copies per cell.
- E. Most plasmids are supercoiled.

8. Chloramphenicol is an inhibitor of
- A. DNA synthesis in prokaryotes.
  - B. DNA synthesis in eukaryotes.
  - C. Protein synthesis in prokaryotes.
  - D. Protein synthesis in eukaryotes.
  - E. All of the above.

二. 選擇題(均為單選, 每題 1 分, 答錯倒扣 0.25 分)

9. The molecule in the  $C_4$  pathway that combines with carbon dioxide is
- A. citric acid.
  - B. phosphoenol pyruvic acid.
  - C. ribulose biphosphate.
  - D. glyceraldehyde phosphate.
  - E. none of the above.
10. The micrometer ( $\mu\text{m}$ ) is the most useful unit for expressing the size of cells and larger organelles. A micrometer corresponds to
- A. one-billionth of a meter. ( $10^{-9}\text{m}$ ).
  - B. one-millionth of a meter ( $10^{-6}\text{m}$ ).
  - C. one angstrom ( $10^{-10}\text{m}$ ).
  - D. one-thousandth of a meter ( $10^{-3}\text{m}$ ).
  - E. none of the above.
11. The initial carbon fixation by the Hatch-Slack cycle occurs within the
- A. bundle sheath cells.
  - B. epidermal cells.
  - C. mesophyll cells.
  - D. vascular tissue.
  - E. none of the above.
12. Which of the following carriers is not involved in electron transfer of photosynthesis?
- A. Plastoquinone.
  - B. Plastocyanin
  - C. Ferredoxin
  - D. Cytochromes
  - E. None of the above
13. The two types of cellular organelles that transform energy are
- A. chloroplasts and leucoplasts.
  - B. mitochondria and chloroplasts.
  - C. chromoplast and mitochondria.
  - D. lysosomes and chloroplasts.
  - E. none of the above.

14. Which of the following cellular organelles extracts energy from carbohydrates and forms ATP molecules ?
- A. chromoplast
  - B. chloroplast
  - C. mitochondrion
  - D. lysosome
  - E. none of the above
15. During protein synthesis the initial steps in glycosylation take place in
- A. Golgi complex.
  - B. smooth endoplasmic reticulum.
  - C. rough endoplasmic reticulum.
  - D. lysosome.
  - E. none of the above.

三選擇題(每題2分,答錯倒扣0.5分)

Answer questions 16-19 according to the following key:

- 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.
16. The fluid-mosaic model for membrane structure proposes that
- 1. membrane components cannot move laterally within the bilayer.
  - 2. some proteins could span the lipid bilayer.
  - 3. the outer and inner faces of the membrane are identical.
  - 4. lipid molecules exhibit lateral movement within the membrane bilayer.
17. The "cell theory" which was originally postulated by Schwann in 1839 and expanded by Virchow 20 years later states that
- 1. all organisms consist of one or more cells.
  - 2. the cell is the basic unit of structure for all organisms.
  - 3. all cells arise from preexisting cells.
  - 4. cells are mobile.
18. Which of the following structures are not contained in prokaryotes ?
- 1. DNA molecule
  - 2. Microtubules
  - 3. Ribosomes
  - 4. Intermediate filaments
19. The cell wall of a gram-positive bacteria consists of which of the following compounds ?
- 1. Peptidoglycans

2. N-acetylglucosamine
3. N-acetylmuramic acid
4. Teichoic acid

四簡答題( 20-23, 每題 3 分, 24-28, 每題 2 分 )

Define or explain

20. Pinocytosis
21.  $F_0$  particle
22. Gap junction
23. Freeze-fracturing
24. Aneuploid
25. Homeo box
26. Lampbrush chromosome
27. Myelin sheath
28. Carcinogen

五問答題

29. (6%) Describe the methods to produce and select hybridoma cells for the preparation of monoclonal antibodies.
30. (5%) Describe the flow of electrons in noncyclic photophosphorylation.
31. (4%) What are the functions of the sodium-potassium pump in most cells.
32. (4%) Describe the general route for the synthesis and secretion of a secretory proteins.
33. (4%) List the factors which influence the fluidity of biological membranes.
34. (5%) Describe the Embrogenesis of Frog Embryo (or) Sea urchin Embryo.
35. (5%) How is a skeletal muscle stimulated to contract ? Describe briefly.
36. (8%) Indicate four stages of each meiotic division and describe the major events occurring during each stage.
37. (6%) Describe the general pattern for eukaryotic mRNA processing and splicing.