國立中山大學114學年度
碩士班考試入學招生考試試題

科目名稱：普通生物學【海資系碩士班選考】

—作答注意事項—

考試時間：100分鐘

- **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。**請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- **答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示**，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
- 答案卡請以2B鉛筆劃記，不可使用修正液（帶）塗改，未使用2B鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶書籍、紙張（應考證不得做計算紙書寫）、具有通訊、記憶、傳輸或收發等功能之相關電子產品或其他有礙試場安寧、考試公平之各類器材入場。
- **試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。**
- **試題採雙面列印，考生應注意試題頁數確實作答。**
- **違規者依本校招生考試試場規則及違規處理辦法處理。**

國立中山大學114學年度碩士班考試入學招生考試試題

科目名稱：普通生物學【海資系碩士班選考】
※本科目依簡章規定「不可以」使用計算機(混合題)

題號：452002

Single Choice Questions (4 points each, 20 questions in total)

1. **What is the function of an operon in prokaryotic cells?**
   A. To control RNA processing
   B. To regulate gene transcription
   C. To activate or inhibit gene translation
   D. To repair DNA damage

2. **In eukaryotic cells, where does the Krebs cycle occur?**
   A. Cytoplasm
   B. Mitochondria
   C. Nucleus
   D. Chloroplast

3. **Which pigment is most important for photosynthesis?**
   A. Carotenoids
   B. Chlorophyll
   C. Anthocyanins
   D. Hemoglobin

4. **What is the main donor of electrons in the light reactions of photosynthesis?**
   A. Water
   B. Light
   C. ATP
   D. Oxygen

5. **What is the purpose of mitosis?**
   A. To produce energy
   B. To create identical cells
   C. To produce gametes
   D. To break down waste

6. **In which phase of mitosis do chromosomes align at the center of the cell?**
   A. Prophase
   B. Metaphase
   C. Anaphase
   D. Telophase

7. **What happens to plant cells when placed in a hypertonic solution?**
   A. Osmotic lysis
   B. Plasmolysis
   C. Swelling due to water absorption
   D. Active uptake of solutes

8. **What is the specific location of a gene on a chromosome called?**
   A. Locus
   B. Allele
   C. Genome

D. Trait

9. **What is the main function of RNA polymerase during transcription?**
   A. To create DNA fragments
   B. To translate RNA sequences into proteins
   C. To synthesize RNA strands using DNA as a template
   D. To convert RNA into DNA

10. **What is the primary role of fungi in an ecosystem?**
   A. To produce oxygen
   B. To decompose organic matter
   C. To absorb sunlight
   D. To produce glucose

11. **What is the main difference between algae and plants?**
   A. Algae can move using flagella
   B. Algae do not perform photosynthesis
   C. Algae lack roots, stems, and leaves
   D. Algae cannot live in water

12. **Where do the light reactions of photosynthesis occur?**
   A. Chloroplast stroma
   B. Chloroplast thylakoid membrane
   C. Cytoplasm
   D. Nucleus

13. **In the first step of the Calvin cycle, carbon dioxide combines with which molecule?**
   A. Carbohydrates
   B. Water
   C. Ribulose bisphosphate (RuBP)
   D. NADPH

14. **What is a key characteristic of protists?**
   A. Unicellular and only autotrophic
   B. Unicellular or multicellular with a nucleus
   C. Lack of a nucleus, like bacteria
   D. Can only live on land

15. **Which of the following best describes the ecological roles of protists?**
   A. Decomposers
   B. Photosynthesizers
   C. Pathogens
   D. All of the above

16. **In the alternation of generations in plants, which generation is diploid?**
   A. Gametophyte
   B. Sporophyte
   C. Gametes
   D. None of the above

17. **In an experiment, the transport of some substances stops after adding an ATP inhibitor. What does this suggest about the transport mechanism?**
A. Diffusion
B. Passive transport
C. Active transport
D. Osmosis

18. **If oxygen is limited, what is the primary source of ATP in a cell?**
A. Glycolysis
B. Krebs cycle
C. Electron transport chain
D. Oxidative phosphorylation

19. **Why must the light and dark reactions of photosynthesis work closely together?**
A. Oxygen produced in the light reaction is essential for the dark reaction
B. Sugars produced in the dark reaction are energy sources for the light reaction
C. Light reactions provide ATP and NADPH for the dark reaction
D. Dark reactions regulate the light-sensitive proteins of the light reaction

20. **Which of the following best supports the endosymbiotic theory?**
A. Mitochondria and chloroplasts have double membranes
B. Eukaryotic cells contain the endoplasmic reticulum
C. Prokaryotic cells can survive in extreme environments
D. The DNA in the nucleus is identical to that in mitochondria

Essay Question (20 points each, one question in total)

1. **Why are certain organisms chosen as model organisms? Explain the key features that make them suitable for research, and give examples.**