

## 一、選擇題(每題 3 分, 共 24 分, 請在選擇題作答區依序作答)

1. 在一個新近分化的兩個族群中, 天擇有時會造成族群間雜交的頻率下降, 而促進種化的發生, 這個過程稱為?

- (A) Hybridization; (B) Purifying selection; (C) Reinforcement; (D) Convergence

2. 一個族群因故由本來的分布範圍變為兩個或兩個以上的分布區域, 這個現象稱為?

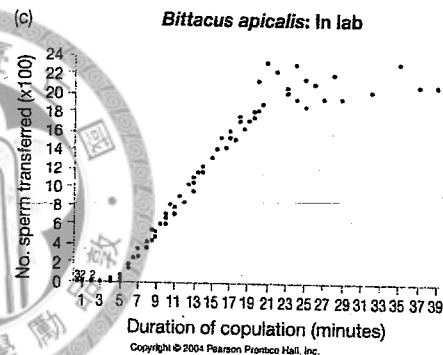
- (A) Vacariance; (B) Divergence; (C) Phylogenesis; (D) Postzygotic isolation

3. 下列何者不是 *Hox* 基因和 *MADS-box* 基因的共同點?

- (A) Many of them involved in developmental regulation  
(B) They are transcriptional factors  
(C) They can be found in both animals and plants  
(D) They shared a conserved motif in the sequences

4. 右圖為黑翅懸尾蠅交配時間與實際精子傳遞數目的對應圖。依據此圖的結果, 下列的敘述何者正確?

- (A) Female will wait five minutes before start to copulate with male flies  
(B) The longer a pair copulates, the more sperm the female allows the male to transfer  
(C) After five minutes of copulation, the male needs to present himself as food to the female  
(D) The females prefer the males bringing smaller gift for food



5. 在某一地區本來有 800 個個體, 其基因型為  $A_1A_1$ , 之後由外地移入了 200 個基因型為  $A_2A_2$  的個體。若已知  $A_2$  為隱性的不良等位基因型, 而對於  $A_2$  之選汰係數為  $s = 0.5$  試問在哈溫定律的理想環境下, 下一代的  $A_2$  基因型頻率為何?

- (A) 0.10; (B) 0.15; (C) 0.18; (D) 0.20

6. 下列有關寒武紀的描述何者錯誤?

- (A) The Cambrian explosion was characterized by the sudden appearance of diverse animal body structures  
(B) The fossils at Chengjiang (澄江) provide a tremendous amount of data of Cambrian explosion  
(C) The Chicxulub crater is the remain of the meteorite strike lead to the mass extinction  
(D) Animals with segmented body plans were first appeared in this period

7. 下列有關物種滅絕速率的描述何者正確?

- (A) Uncorrelated with how long a species existed  
(B) Positively correlated with how long a species existed if it existed less than 10,000 years  
(C) Negatively correlated with how long a species existed if it existed less than 10,000 years  
(D) Negatively correlated with how long a species existed if it existed less than 10,000 years, but positively correlated if it existed more than 10,000 years

8. 一位生物學家在野外檢查了一個鳥類族群的形態特徵(trait)，在計算了兩個特徵的 heritability ( $h$ ，遺傳性)之後，得到 A 特徵之  $h_A = 0.02$ ，B 特徵之  $h_B = 0.99$ 。下列描述何者正確？

- (A) Trait A has strong genetic variation, and is heavily influenced by environmental factors
- (B) Trait A has little genetic variation, therefore evolution cannot change this trait from generation to generation
- (C) Trait B has high heritability, indicating environment has strong effect on the phenotype
- (D) Trait B has higher genetic variation in the population, and Trait A has little or no variation

二、解釋名詞 (一至四小題每題 5 分，第五小題 6 分，共 26 分，請在答案卷上依序作答)

- 1. Adaptive radiation
- 2. Selection units/levels
- 3. Evolutionary forces
- 4. Disruptive evolution
- 5. Compare the difference between monophyletic and non-monophyletic group (6 分)

三、簡答題 (共計 50 分，請在答案卷上依序作答)

- 1. 突變有無方向性？而 Natural Selection 是否有方向性？Natural selection 是漸近式 (gradual progress) 的嗎？(10 分)
- 2. 何謂族群遺傳學？請舉例說明其對演化生物學的貢獻。(10 分)
- 3. 拉馬克的「Inheritance of acquired characters」學說在近代如何被「文化演化」學派重新詮釋？(10 分)
- 4. 何謂 linkage disequilibrium？在一個族群中，造成 linkage disequilibrium 的原因為何？(10 分)
- 5. 在 1992 年，史波斯基(C. M. Spolsky)等人發現在美洲的一種無性生殖的蠟螈(mole salamander)，其遺傳變異相當低，而且已經在當地生存超過五百萬年，比類似物種還長。試就其所生存環境與其族群大小(如大於 1000 或小於 100)狀況，討論其可能發生的原因。(10 分)

試題隨卷繳回