**Student Name:** _____

**Student Number:** _____

UNIVERSITY OF TORONTO
Faculty of Arts and Science

26 APRIL 2011 EXAMINATION

# EVOLUTION & ADAPTATION
EEB214H1S

Duration - 3 hours
No Aids Allowed

9 pages total (possible 100 marks)

Questions CAN be Answered in Essay OR Point Form Directly on the Exam

Please Use Back of Page if Necessary to Answer Questions

*(5 MARKS)* **1. Mark the following statements either TRUE or FALSE.**

_____ Sexual selection is stronger in monogamous than polygamous mating systems.

_____ Eurcaryotic cells are thought to be an evolutionary example of symbiosis.

_____ The behaviour of crows feeding on whelks can be explained by optimal foraging theory that minimizes net energy gain.

_____ Two-thirds of flowering plants are pollinated by animal mutualists.

_____ Parasites are more likely to be specialists than generalists in terms of host specificity.

*(6 MARKS)* **2. Match the following terms *(e.g., Whales & Penguins-----Convergent Evolution)*:**

| | |
|---|---|
| Scrub Jays | Habitat Destruction |
| Zebra Mussels | Mate-Guarding |
| Extinction | Camoflauge |
| Animal Bioreactors | Genetic Engineering |
| Peppered Moths | Cooperative Breeding |
| Sperm Plug | Invasive Species |

*(3 MARKS)* **3. What key aspects of Darwin and Wallace's *'new theory'* made it so unique and revolutionary?**

*(4 MARKS)* **4. Why is sexual reproduction thought to lead to poorly adapted traits more readily in males than in females? <u>Provide ONE example</u> to illustrate your point.**

*(5 MARKS)* **5. What is meant by *'COST-BENEFIT TRADE-OFF'* in terms of evolutionary adaptation? Provide an example that illustrates this trade-off.**

*(6 MARKS)* **6. Charles Darwin once wrote,** *"It is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change."* **Explain what Darwin meant by this.**

*(5 MARKS)* **7.** *PARASITISM* **has evolved periodically in the animal kingdom as a successful strategy. Giving examples, explain under what conditions such an adaptation would be favoured** *(i.e. What are the benefits of being a parasite?).*

*(4 MARKS)* **8. Why do we say *Habitat* is the most important of the four basic drivers that shape a biological organism's adaptations?**

*(7 MARKS)* **9. Providing examples, describe what is meant by the following quote from E.O. Wilson (1996),** *"Almost all species that ever lived are extinct and yet more are alive today than at any time in the past."* **Make sure you include mention of biodiversity in your answer.**

*(24 MARKS)* **10. Compare and contrast <u>EACH of the following PAIRS of terms</u>, providing a specific example for each term.** *Use the back of the page as necessary.*

a) **Plant Feeders vs Animal Feeders** *(6 MARKS)*

b) **Reproductive Investment vs Mating Effort** *(6 MARKS)*

c) **Co-Evolution vs Convergent Evolution** *(6 MARKS)*

d) **Inter-Specific vs Intra-Specific** *(6 MARKS)*

*(8 MARKS)* **11.** *A number of scientific theories and/or hypotheses were presented in this course that provide evolutionary explanations for adaptation in animals.* **Describe <u>ONLY TWO</u> of these hypotheses/theories using an example to illustrate each.**

*(4 MARKS)* **12. What is meant by the term *Phenotype*? Why is it important for understanding evolution in the biological world?**

*(9 MARKS)* **13.** *Evolution has led to two biological organisms sharing or cooperating in attaining one or more of their four life goals termed either:* **MUTUALISM or SOCIALITY.**

**<u>Choose ONLY ONE</u> of these two and with an example, discuss** *(point form or essay)* **in terms of adaptations that have arisen in morphology, physiology, and/or behaviour that enable this unique relationship.**

*(10 MARKS)* **14.** *Answer* ***ONLY ONE*** *of the following questions in essay or point form. Use the back of this page if necessary.*

**a) In what way have we humans become** *'Agents of Selection'* **in the evolution of the biological world? Use examples where possible to explain your answer.**

**OR**

**b) Outline the steps and changing concepts in the development of the** *'Theory of Evolution by Natural Selection'* **providing both the chronological highlights and the evidence that was used to develop it.**

Total pages = 9
Total marks = 100