



## **FACULTY OF SCIENCE**

### **DEPARTMENT OF ZOOLOGY**

<b>MODULE</b>	<b>ZOO0099</b>
<b>CAMPUS</b>	<b>APK</b>
<b>EXAM</b>	<b>November 2016</b>

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**DATE: 25 November**

**ASSESSOR(S)**

**INTERNAL MODERATOR**

**EXTERNAL MODERATOR**

**DURATION: 2 HOURS**

**SESSION: 13h00**

**PROF PR TESKE**

**PROF BJ VAN VUUREN**

**PROF P KING**

**MARKS: 50**

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**NUMBER OF PAGES: 3**

**INSTRUCTIONS: Answer all questions and write legibly**

### QUESTION 1

Provide brief definitions of the following terms (1-2 sentences each):

- 1.1 Center of accumulation hypothesis [2]
- 1.2 Despeciation [2]
- 1.3 Eastern Pacific barrier [2]
- 1.4 Allopolyploid hybrid speciation [2]
- 1.5 Vicariance [2]
- 1.6 Bantu expansion [2]
- 1.7 Peripatric speciation [2]

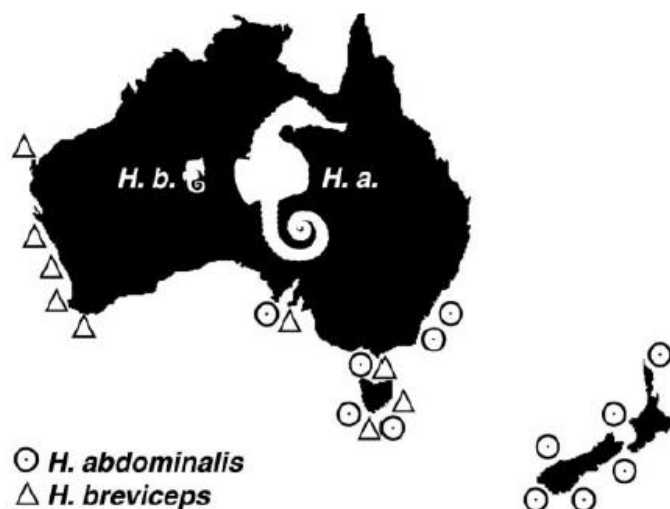
### QUESTION 2

[8]

Describe how climate change can result in speciation in a) terrestrial species and b) marine species (2 examples each).

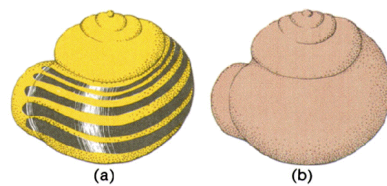
### QUESTION 3

The occurrence of very large and very small sister species of seahorses (genus *Hippocampus*) in the same habitats has been interpreted as assortative mating having resulted in sympatric speciation. By taking into consideration the distribution map of two South Pacific seahorses below, suggest an alternative explanation. [10]



#### QUESTION 4

[10]



Shell color variation in European land snail (*Capaea nemoralis*)  
Shells are yellow or pink, and banded or unbanded;  
the number and position of bands also varies.  
(Griffiths et al. 1996)

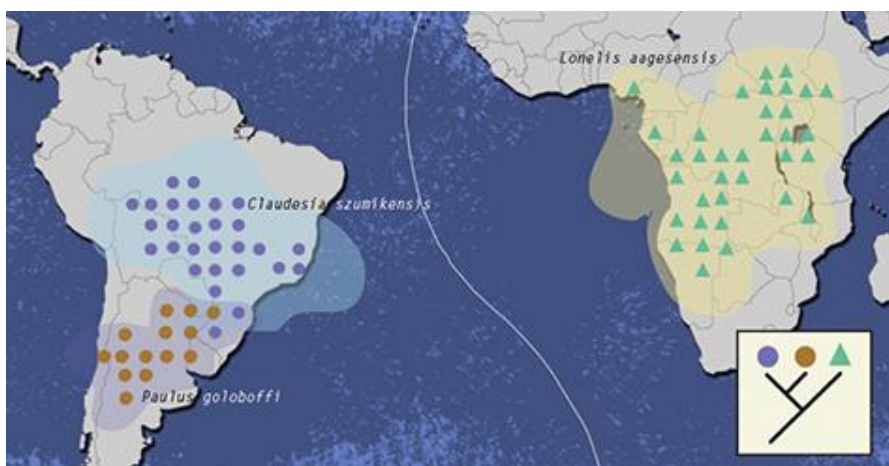
Land snails of the genus *Capaea* occur as closely related colour morphs in Eurasian shrublands and woodlands. Snails with yellow shells that have dark stripes (a) are particularly common in shrubland, whereas woodlands are inhabited by pink snails without stripes (b). In each habitat type, shell coloration helps to avoid being detected by avian predators. Which type of natural selection is at play for each of the two evolutionary histories described below? Briefly motivate your answer.

- a. The original habitat in the range of *Capaea* was grassland. When the large grazing megafauna became extinct, drier areas over time became shrubland, and wetter areas woodland
- b. *Capaea* originated in shrubland, and over time established itself in woodland

#### QUESTION 5

[8]

Provide at least four explanations for the biogeographic patterns depicted in the figure below (multiple explanations are possible). In each case, state what type of speciation (allopatric, peripatric, parapatric or sympatric) would have taken place. Bonus points are given for reasonable additional explanations.



Total marks [50]