BIO 1130 An Introduction to Organismal biology
Final examination
Worth 35% of your final grade
Total points for both parts of the exam is 110 pts

December 10, 2012
Part B: Written questions

a) Place your name and student number in the space provided below. Be sure only your student number, is on the top of each of the following pages – the exam will be separated and if you name is not on a page your mark will be zero for that page. This part of the exam is worth 65 points.

b) Answer all questions in the space provided on the exam. Do not transfer answers to the back of the page.

c) You may use either pencil of ink for your answers.

d) Answers as written paragraphs are preferred but point form is acceptable as long as the points are logically organized and not random statements or facts

e) This is not an open book exam.

f) A calculator is not required for the exam

g) There are seven pages including this one in part B of the exam, be sure you have all seven pages

Name: _____

Student number: _____

18 pts Part 1. Briefly explain what each of the following terms means or the biological contribution made by the person. Where possible include an example in your explanation from a group or an organism to which the term or name applies.

Mass extinction
{Loss of more than {50% }of the genera. They must be clear that it is not the loss of 50% of a species but some higher level of classification if only 50% one point if the meaning is clear a second point} {identify that there have been 5 mass extinctions}

Plasmogamy

{Fungi}{fusion of the cytoplasm of two cells/not the fusion of the nuclei}{results in the dikaryotic/heterokaryotic condition with two separate nuclei}

Epicuticle

{Outer most part of the insect cuticle – all of this must be together for one point}{contains waxes (may mention proteins but waxes important)} that waterproof the surface.}

Flood Basalt
{Large releases of magma from below the earth's crust}{associated with the movement of continents during continental drift}{May be one of the causes of mass extinction}

Ediacaran fossils

{Fossils older than the Cambrian/from around snowball earth/600 million years ago – a statement of when they were formed}{Mistaken Point Newfoundland}{examples of early multicellularity/fractal design multicellularity}

Gametangia

{Site of gamete formation in plants, must have the two of these together} {Antheridia produce sperm} {Archegonia produce eggs}

Anything written below this line will not be marked.

29 pts Part 2: Fill in the missing word, or provide the one word answer in the space provided at the end of the sentence. If the line is missing, add it.

2.1 Genetic drift isn't as likely in this size of a populations. **Large/big**

2.2 Mosses and many of these similar plants live in moist environments because their cuticle doesn't have this property. **Waterproof/waxes**

2.3 Number of mass extinctions like the one at the end of the Ordovician that have happened.. **Five/six**

2.4 The type of animal most commonly used by flowering plants for pollination. **Insects**

2.5 The feeding strategy of fungi. **Saprophytic**

2.6 This type of reptile skull had one opening in the skull to accommodate the jaw muscles. **Synapsid**

2.7 Terrestrial plants evolved from this type of algae. **Green**

2.8 This type of body symmetry in animals may be linked to changes in the homeotic genes at the time of the Cambrian explosion. **Bilateral**

2.9 These valves or openings in the body wall of an insect, connect with the tubes that carry air to the inside of the animal. **Spiracles**

2.10 The developing sporophyte develops after this type of cell division by the fertilized zygote. **Mitosis**

2.11 This type of geothermal discharge was probably the source of the greenhouse gases the melted the frozen planet earth prior to the Cambrian. **Volcanic/Flood basalt**

2.12 An increase in this mineral in the Cambrian oceans may explain the sudden appearance of the shelly animals in the fossils of the Cambrian. **Calcium**

2.13 Number of nuclei in the female gametophyte of a flowering plant. **Eight**

2.14 Although there is increasing evidence to the contrary it is still generally believed that this form of animal appears at the start of the Cambrian period. **Multicellular**

2.15 Some species of plants grow at the top of the hill others at the bottom. It's an example of this type of isolating mechanism. **Habitat**

2.16 Different species of frogs sing their mating songs at different times of the day. It's an example of this type of isolating mechanism. **Temporal**

2.17 Do fungi have swimming gametes? **Yes**

2.18 The base of the feather that emerges from the follicle that forms it. **Quil**

2.19 This structure contains the microsporangia of flowering plants. **Anther**

2.20 This part of the range of variation is selected against in disruptive selection. **Middle**

2.21 Mosses are an example of this type of plant architecture. **Nonvascular**

2.22 One of the consequences of not having any mesoderm is that you don't have these either. **Muscles**

2.23 The protostomes may be actually two different taxa. One is the Lophotrochozoa, the other is this. **Ecdysozoa**

2.24 A mass of photosynthetic plant cells. **Thallus**

2.25 In nonvascular plants these special cups can assist in getting water soaked sperm to the egg. **Splash**

2.26 Alternate forms that a gene can take. **Alleles**

2.27 In conifers (gymnosperms) pollen is dispersed using this. **Wind**

2.28 The Cambrian fauna were the first to do this tapped into a food resource on the oceans bottom that no one had been able to use. **Burrow/dig**

2.29 The only living group of vertebrates without an opening in the skull to accommodate the jaw muscles. **Turtles**

Part three of the exam is on the next page

18 pts Part 3: Answer the following three questions in the space provided.

6 pts 3.1 What is the difference between allopatric and sympatric speciation. Give an example of each.

{Both are reproductive isolating mechanisms that result in new species}

Allopatric speciation:

- {Involved geographic separation}
- Two types:
    - {Vicariance – glaciers, movements of the earth surface all may split a population up}
    - {Dispersion/Parapatric – Movement across a barrier that brings about the isolation mechanism}

Sympatric speciation

- {Geographic isolation is not required to isolate}
- {Example changes in diet. A population of one species of bird that diverges in beak size when food/seeds are either large or small and there are no intermediate sizes. Insects that spend their life on a food plant and there is a change in the host plant – maybe introduced or a mutation

6 pts 3.2 Both plants and animals have to protect their body surfaces from water loss in the terrestrial environment. Use a plant, an invertebrate and vertebrate animal to explain how this is done.

Plant: {waxes in the cuticle}{Stomata that open and close to restrict air movements

Invertebrate: Insect {epiculticle with waxes}{Also waterproofs transport surface to gas exchange which carries air directly to tissues}

Vertebrate: (Keratinization of the skin to make it water proof} {Internalization of the large respiratory surface}

6 pts 3.3The biological and phylogenetic species concepts have advantages and disadvantages. What are each of these concepts based on and give an advantage and disadvantage for each of the concepts.

When marking this question they should be showing how something is a problem with one definition and resolved by the other. Must have the two definitions for two points and 4 advantage disadvantage to get to the six points.

Biological species:

- Definition: A population of interbreeding organisms
- Advantage: Reproductive isolation easy to assess and measure
- Disadvantage: Same species from different populations may breed and be viable. Doesn't work with asexual/prokaryotes, Doesn't work with fossils

Phylogenetic species:

- {Definition: Organisms sharing the same autapomorphies/Synapomorphies/derived traits}
- Advantage: Uses cladistics analysis so the species can be isolated in different locations and potentially interbreed. Can be used with fossils, can be used with asexual organisms through the use of genetic codes.
- Disadvantage: Needs clear definition when the branching stops and what a species will be

Anything written below this line will not be marked.