

**BIO 1130 An Introduction to Organismal biology**  
**Midterm examination**  
**Worth either 15% or 20% of your final grade**  
**Total points for both parts of the exam is 60 pts**

**Saturday, October 5, 2013**

**Part B: Written questions**

- a) Place your name and student number in the space provided below. Be sure that your student number is on the top of each of the following pages – the exam will be separated. ONLY place your student number on the pages where indicated
- 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 or 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) There are five pages including this one in part B of the exam, be sure you have all five pages.
- g) Enter the multiple choice exam code in the space provided

**Name:** \_\_\_\_\_

**Student number:** \_\_\_\_\_

**Multiple Choice Exam Code (MM or FF):** \_\_\_\_\_



**12 pts Part 1.** Briefly explain what each of the following or phrases 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.

3rd age of sand/silica

{Douglas /Adams} {silica forms computer chips/computer changing science} {allows large amounts of information processing/storage and analysis (not sharing of data that's the fourth age)} {alternate view of the history of science}

Ultimate cause

{Ask questions that deal with things such as evolution and relationships and the big picture/often natural science} {Look for the larger patterns in a series of observations - ex when a stimulus causes an action or behaviour the question asks why did this behaviour evolve this way – there will no doubt be other examples but evolution is involved in Ultimate cause questions } {report the findings as a story or narrative} {Why questions} { } Must have first two for a point each – either of the third or the fourth to give the maximum of 3 points

Disruptive selection

{when the extremes/tails of the distribution have better fitness than the middle or intermediate} {results in dimorphisms/may lead to speciation} {example finch beaks when seeds are either small or large/ during drought – there may be other examples including finches that feed on seeds and small beaks feeding on insects under bark}

Mechanical taxonomy

{introduced by Linneaus} {unlimited number of object because they are in written form} {Arbitrarily categories that were nested/hierchial within each other } No marks for binomen since that is not a characteristic of this type of taxonomy.

**18 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 to the end of the line.

2.1 The number of major groups (taxa) in the original taxonomic scheme proposed by Linnaeus. Five

2.2 Until the start of the 19th century people that studied the living world were commonly referred to as this type of investigator or scientist. Naturalists

2.3 Two different taxa have similar looking structures that function in similar ways. It's an example of this type of evolution. Convergent

2.4 Douglas Adams divides the history of modern science into four ages what was the principle investigative tool of his first age of sand. Telescope

2.5 The evolutionary history of a group of organisms is expressed as this. Phylogeny

2.6 He used peas in the experiments that resulted in the two laws of genetics. Mendel

2.7 Natural sciences and physical scientists both agree that the objects that they study are subject to the laws of this discipline and those of physics. Chemistry

2.8 Polyploidy in plants resulting from the combination of gametes from two different species. Allopolyploidy

2.9 Pasteur discredits this form of generation for how living things first appear. Spontaneous

2.10 After recovering from the loss of Roman commerce and infrastructure, education and architecture flourished in Europe during this part of the medieval age. High

2.11 In the classification scheme after Kingdom, Phylum, Class comes this taxon. Order

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Don't enter your name.

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2.12 Type of cause that a molecular biologist is working with when comparing the DNA sequence of a gene in a healthy compared to sick person with a genetic

disease. Proximate

2.13 Sickle cell anaemia is prevalent in populations with malaria. It's an example of this type of selection or fitness. Heterozygous

2.14 Ibn al-Baitar was interested in the \_\_\_\_\_

Medicinal/Pharmacology property of plants and published an encyclopedia on their uses.

2.15 These types of characters are found in the ancestral stock of any taxon, it doesn't mean that they are inferior characters. Primitive

2.16 Every animal in a taxon shares this type of ancestor. Common

2.17 When the gene sequence along a chromosome changes from abcdefg to

abcdecdefg. Duplication

2.18 In English grammar the Genus name most closely resembles

this. Noun

**Part three of the exam is on the next page**

**10 pts Part 3:** Answer the following two questions in the space provided.

3.1 What is Darwin's theory on Common ancestry? In your answer provide two observations/examples that support the theory.

{challenged the validity Scala Naturae/general knowledge was that the numbers of species appeared all at once} {There was no relationship between the different forms because they all appeared at once} {Darwin says that a branching pattern of new forms exists and branches over time creating new species} Examples must include an explanation of why it fits it can't just be the name an organism or process {examples could include: comparative anatomy and the homology of the limbs of vertebrates if fossils used the answer must included aspects of comparative anatomy/morphology} {Comparative embryology – similarities in growth of the embryo, gill slits, spiral and radial cleavage at 8-cell stage in animal embryos} {Vestigial structures: Goosebumps, nictitating membrane} {Biogeography – adaptations to environmental differences – Mammoth in the north and relationship with elephants} {similarities in molecular structures and sequences of proteins and DNA}

There are no points for naming a field of biology that supports the theory the points are for an example from any of the fields. If however a minimum three of the five fields" Comparative anatomy, comparative embryology, vestigial structures, biogeography and molecules are provided without an example then one point can be awarded.

3.2 What is the bottle neck effect and how does it come about; what are the consequences for a population that experiences it?

{Form of Genetic Drift} {small population sizes makes it mathematically improbable to maintain allele/variation frequency between populations} {Population undergone a drastic decrease in number by natural calamity but in same location} {consequence: Loss in amount of variation} {ex: American bison population from only a few hundred, Elephant seals from less than a hundred, Whale populations rebound }

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