

**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 80 pts**

**Saturday, November 7, 2015**

**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) Cell phones must be in your bag or at the front of the room, **NOT** in your pockets or on the desk.
- g) There are five pages including this one in part B of the exam, be sure you have all five pages.
- h) Enter the multiple choice exam code in the space provided

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

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

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

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STUDENT NUMBER: \_\_\_\_\_

Don't enter your name.

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**12 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.

Viroid

{RNA circle will be most common but some will have strand} {must state the size very small/small than virus} {Stops mRNA translation/function} {Plants disease/Hepatitis D}

Stabilizing selection

There are two ways that this can be described by either higher fitness in the midrange of a distribution {When fitness is increased/organisms selected} {mid range of the distribution of the traits is advantageous} or when decreased fitness at the extremes {Fitness of the organisms decreases} {at the extremes/tails of the distribution} {mean value remains the same} If a diagram is used it must clearly indicate whether it increased fitness of extremes or decreased fitness of mid-range. Say selection occurs at: is ambiguous.

Mesozoic

{Geological era} {in the Phanerozoic Eon/dates starts 245-65 million years ago} {Appearance of flowering plants and the age of reptiles – must have both}

Nonsense mutation

{When one base in codon – this point is to be clear that only one base in the triplet changes} {this point explains what happened – change results in the termination/stop codon} {protein chain stops growing/shorted protein result}

**30 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 Prokaryotes are before the kernel and eukaryotes have a true kernel - what's the cellular kernel? \_\_\_\_\_ **Nucleus** \_\_\_\_\_
- 2.2 In the Hardy-Weinberg equation heterozygotes are represented by these variables. \_\_\_\_\_ **pq** \_\_\_\_\_
- 2.3 This atmospheric gas was missing in the first 2.1 billion years of earth's history. \_\_\_\_\_ **Oxygen** \_\_\_\_\_
- 2.4 Viruses often have alphanumeric designations in the case of H1N1 for example what type of molecules do the H and N refer to? \_\_\_\_\_ **Protein** \_\_\_\_\_
- 2.5 The sun is this kind of reactor. \_\_\_\_\_ **Nuclear** \_\_\_\_\_
- 2.6 What percentage of the sun's mass is not made up of the two atoms involved in the nuclear fusion reaction that produces the sun's energy? \_\_\_\_\_ **Two** \_\_\_\_\_
- 2.7 These lipids are found in protocells but not micelles. \_\_\_\_\_ **Phospholipids** \_\_\_\_\_
- 2.8 If the only predator of the goldenrod gall larvae were wasps, what size of gall would be an adaptive strategy against predation. \_\_\_\_\_ **Big** \_\_\_\_\_
- 2.9 Mendel used this non-random mating technique to obtain the strains of pea plants that were homozygous for an allele. \_\_\_\_\_ **Inbreeding** \_\_\_\_\_
- 2.10 The region where genetic exchange occurs between two ring species is referred to as this type of zone. \_\_\_\_\_ **Hybrid** \_\_\_\_\_
- 2.11 Number of domains that the living world is divided into. \_\_\_\_\_ **Three** \_\_\_\_\_
- 2.12 The RNA world is based on the first self replicating system being RNA based. There is an alternative theory and it involves which biopolymers. \_\_\_\_\_ **Protein** \_\_\_\_\_
- 2.13 The bacterial cell wall protects the bacteria from doing this. \_\_\_\_\_ **Swelling** \_\_\_\_\_
- 2.14 Number of lipid layers in a micelle. \_\_\_\_\_ **One** \_\_\_\_\_
- 2.15 This gradient is essential if ATP is to be synthesized in a cell. \_\_\_\_\_ **Proton** \_\_\_\_\_
- 2.16 This substance may have assisted in the chemical formation of long chains of amino acids or nucleotides. \_\_\_\_\_ **Clay** \_\_\_\_\_

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- 2.17 Organic chemistry is the study of the chemistry of this element. \_\_\_\_ **Carbon** \_\_\_\_
- 2.18 During this stage of the viral life cycle hundreds if not thousands of new viral particles are released. \_\_\_\_ **Lytic** \_\_\_\_
- 2.19 This form of cellular complexity arose at the start of the last of four eons in earth's history. \_\_\_\_ **Multicellular** \_\_\_\_
- 2.20 On a planet located in the habitable zone of a solar system, what chemical compound is abundant in its liquid form? \_\_\_\_ **Water** \_\_\_\_
- 2.21 This term describes the genetic complement of a eukaryote organisms and why a single mutation may not be expressed as it would in prokaryotes. \_\_\_\_ **Diploid** \_\_\_\_
- 2.22 Whether its protein or RNA that come first doesn't affect the fact that whichever it was it had to be capable of this. \_\_\_\_ **Replication** \_\_\_\_
- 2.23 The frequency of heterozygotes in a population is higher than the usual 10% expected when there is selection against a recessive trait. In terms of the heterozygotes what is this referred to as. \_\_\_\_ **Advantage** \_\_\_\_
- 2.24 Organic carbon molecules may have origins from outside of the planet are referred to as this type of organic chemical source. \_\_\_\_ **Interstellar** \_\_\_\_
- 2.25 The amount of energy required to raise the temperature of a solution by 1C is referred to as the compound's \_\_\_\_ **Specific heat** \_\_\_\_ (Two words).
- 2.26 An isolated group of individuals from the same species. \_\_\_\_ **Population** \_\_\_\_
- 2.28 Occasionally meiosis fails, and gametes from the same species fuse during self-fertilization in plants and the resulting plant has an increase in its number of chromosomes. This term describes this form of chromosomal mutation. \_\_\_\_ **Autoploidy** \_\_\_\_
- 2.29 This is a measure of the number of offspring that an individual produces in its lifetime. \_\_\_\_ **Fitness** \_\_\_\_
- 2.30 Efforts by conservation agencies to bridge the gap between small isolated populations of the same species is an example of this type of microevolutionary source of change (Two words). \_\_\_\_ **Gene Flow** \_\_\_\_

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

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**12 pts Part 3:** Answer the following two questions in the space provided. Each question is worth 6 points

3.1 Obtaining a carbon source for building organic molecules and harnessing the energy to do it is the basis of the metabolic diversity of Bacteria. Explain the differences or similarities between the following three: (1) Photoautotrophs, (2) Chemoorganotrophs, and (3) Chemolithotrophicheterotrophs. Be sure to identify if any of these are found in Eukaryotes.

Similarities: {1 & 2 both use carbon dioxide as a carbon source}

Differences {3 uses existing C-C bonds that are broken to obtain a carbon source} All three obtain energy differently {1 uses light} {2 uses existing C-C bonds that are broken} {3 from minerals/change of charge/valance in minerals}

1 point: Eukaryote is 1 – the plants

3.2 Eubacteria and Archea have some very distinct differences in how aspects of Biology's central dogma occur. What is the Central Dogma and give two examples of a difference between the two Domains.

Central Dogma: {DNA is self replicating and is used to produce RNA/Transcription} {RNA is used to produce proteins/translation}

Any two of the following:

- {RNA Polymerase} {complex in Archea and simple in bacteria}
- {histone proteins to stabilize DNA} {found in archea absent in bacteria}
- {Primer amino acid in protein synthesis} {methionine in Archea and formylmethione in bacteria}
- {Introns in genes} {found in Archea but not in bacteria}