BIO 1130FF

An introduction to Organismal biology
Midterm examination
Worth either 15% or 20% of your final grade

Saturday, November 7, 2015

Part A: Multiple choice questions
26 points (1 point/question)

Fill in the bubbles for your name and student number and BIO1130FF for the course code. Fill in the same information in text in the boxes above the bubbles.

Use only a pencil to fill in the answer sheet. If you erase a question be sure to erase all of the pencil mark. Don't place any marks anywhere on the sheet other than where the bubbles are for personal information or your answers.

Do not place any answers on the question sheet.

This is not an open book exam.

CAUTION to minimize paper waste this part of the exam has been printed back to back

NOTE: If you do not fill in the student number and course code as **BIO1130FF** it will be impossible to identify your answer sheet and you will receive a **ZERO** for this part of the exam

FF1 What is the main structure of a virus?
a. RNA surrounded by a nuclear envelope.
X b. Nucleic acid molecules surrounded by a protein coat or capsid.
c. Single cell with nucleus and organelles.
d. A cytoplasm enclosed by a membrane.

FF2 Which of the following statements about viral envelopes is correct?
X a. They contain glycoproteins of viral origin.
b. They are located between the virus's capsid and its nucleic acid.
c. They are composed of a lipid bilayer derived from the viral membrane.
d. They are composed of peptidoglycan, the same material as bacterial cell walls.

FF.3 Small circles of DNA that occur in bacteria in addition to the main circular chromosomal DNA molecule are called
a. transformants.
b. plastids.
X c. plasmids.
d. plasmitrons.

FF.4 What is the primary ecological role of prokaryotes?
a. adding methane to the atmosphere
b. parasitizing eukaryotes, thus causing diseases
c. metabolizing materials in extreme environments
X d. breaking down organic matter
e. serving as primary producers in terrestrial environments

FF.5 The two rounds of genomic duplication that occurred in the early evolution of vertebrates is an example of this type of chromosomal mutation (Choose the most precise answer).
a. Translocation
b. Polypolidy
X c. Alloplody
d. Duplication
e. Autoploidy

FF.6 Four of the five population attributes can be calculated with the Hardy-Weinberg equation. Select the EXCEPTION.
a. the frequency of a dominant allele
b. the frequency of homozygous dominant genotypes
X c. the frequency of mutation
d. the frequency of heterozygotes
e. the frequency of a recessive allele

FF.7 In a single molecule of water, two hydrogen atoms are bonded to a single oxygen atom by
a. ionic bonds.
X b. polar covalent bonds.
c. nonpolar covalent bonds.
d. van der Waals interactions.
e. hydrogen bonds.

FF.8 Bacteria participate in the nitrogen cycle through which mechanism?
a. nitrification
b. nitrogen fixation
c. decomposition
d. denitrification
X e. all of the above

FF.9 If we want to know the percentage of particular genotypes within an actual population, assuming complete dominance and two alleles, the one measurement we have to actually make is of the frequency of the
a. dominant phenotypes.
b. heterozygous phenotypes.
c. homozygous dominant genotypes.
X d. recessive phenotypes.
e. heterozygous genotypes.

FF10 Viruses are considered nonliving because they
a. lack a nucleus.
b. lack a cell wall.
X c. cannot reproduce outside a host cell.
d. contain RNA as their genetic material.

FF.11 You measure the variation in toe length of all the students in your class and arrive at numbers that reflect a wide range of variation, with some short toes, some long and just about every length in between those two extremes. Your conclusion is that toe length is subject to
X a. quantitative variation.
b. allele polymorphism.
c. qualitative variation.
d. microevolution.

FF.12 Radiometric dating is a technique used to determine the age of rocks. Geologists have used this technique to determine that:
a. Earth is about 6.2 trillion years old, and life appeared on Earth about 4.9 trillion years ago.
b. Earth is about 4.6 million years old, and life appeared on Earth about 4.4 million years ago.
c. Earth is about 6.2 thousand years old, and life appeared on Earth about 6 thousand years ago.
X d. Earth is about 4.6 billion years old, and life appeared on Earth about 3.4 billion years ago.

FF.13 Which of the following characteristic would likely be true for a bacterium that stains positive in a gram stain test?
X a. Thicker peptidoglycan in cell wall
b. Less sensitive to penicillin
c. Two cell membranes
d. No plasma membrane

FF.14 Microevolution can be said to have taken place when
a. several mutations occur in a population.
b. a population has different forms of the same gene.
c. a feature of an individual animal changes through use or disuse.
X d. a population experiences a shift in allele frequencies.
e. a mutation occurs in a population.

FF.15 Which type of bond must be broken for water to vaporize?

X a. hydrogen bonds
b. polar covalent bonds
c. ionic bonds
d. nonpolar covalent bonds
e. covalent bonds

FF.16 When the sequence of the human genome was published what was the approximate percentage of the genome that was viral DNA?

a. 15%
X b. 8%
c. 2%
e. 0% - None

FF.17 The enzyme reverse transcriptase is used by HIV viruses to catalyze the synthesis of _____.

a. RNA from a template DNA strand
X b. DNA from a template RNA strand
c. RNA from a template RNA strand
d. DNA from a template DNA strand

FF.18 Modern wheat contains a complete set of Chromosomes from three different species. This is an example of which type of chromosomal mutation? (Choose the most precise answer.)

a. Translocation
b. Polypolidy
X c. Alloplody
d. Duplication
e. Autoploidy

FF.19 Which of these statements about prokaryotes is correct?

a. Bacterial cells conjugate to mutually exchange genetic material.
b. Their genetic material is confined within a nuclear envelope.
c. Genetic variation in bacteria is not known to occur, nor should it occur, because of their asexual mode of reproduction.
X d. They divide by binary fission, without mitosis or meiosis.

FF.20 This part of the bacterial flagellum spans across the membranes and cell wall and is anchored in place by protein rings.

a. Flagellum
b. hook
X c. Motor
d. Filament

FF.21 An Eastern European immigrant carrying the allele for TaySachs disease settled in a small village on the St. Lawrence River. Many generations later, the frequency of the allele in that village is statistically higher than it is in the immigrant's homeland. What microevolutionary principle does this story describe?

X a. founder effect
b. natural selection
c. Hardy-Weinberg genetic equilibrium
d. neutral variation
e. bottle neck effect

FF.22 Which free-living cells were the earliest contributors to the formation of Earth's oxidizing atmosphere?

a. endosymbionts
b. mitochondria
c. seaweeds
X d. cyanobacteria
e. chloroplasts

FF.23 A prophage is a/an _____.

a. virus that attacks bacteria but does not cause disease in animals or plants
X b. viral genome, integrated into the host cell chromosome
c. infective particle made up of nucleic acid and protein
d. virus that is capable of entering the lytic but not lysogenic cycle

FF.24 RNA molecules can both carry genetic information and be catalytic. This supports the proposal that

X a. RNA was the first hereditary information.
b. free nucleotides would not have been necessary ingredients in the synthesis of new RNA molecules.
c. protocells had an RNA membrane.
d. RNA could make energy.
e. RNA is a polymer of amino acids.

FF.25 Which of these is the smallest unit upon which natural selection directly acts?

a. a population's gene frequency
b. an individual's genome
c. an individual's genotype
d. an individual's phenotype
X e. a species' gene frequency

FF.26 When a gamete receives the same number of chromosomes as a somatic cell,

X a. an unreduced gamete is formed and autopolyploidy is present.
b. a reduced gamete is formed and autopolyploidy is present.
c. a reduced gamete is formed and allopolyploidy is present.
d. an unreduced gamete is formed and allopolyploidy and autopolyploidy are present.