BIO 1130MM

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 BIO1130MM 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 **BIO1130MM** it will be impossible to identify your answer sheet and you will receive a **ZERO** for this part of the exam

MM.1 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

MM.2 A recessive allele may be maintained within a larger population because of

X a. diploidy.
b. gene flow.
c. sexual selection.
d. genetic drift.

MM.3 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

MM.4 Virulent phages undergo a (n) ____ life cycle.

a. infective
b. lysogenic
X c. lytic
d. retroviral

MM.5 Why does ice float in liquid water?

a. Ice always has air bubbles that keep it afloat.
X b. Hydrogen bonds stabilize and keep the molecules of ice farther apart than the water molecules of liquid water.
c. The crystalline lattice of ice causes it to be denser than liquid water.
d. The ionic bonds between the molecules in ice prevent the ice from sinking.
e. The liquid water molecules have more kinetic energy and thus support the ice.

MM.6 Which of the following statements about archaea is correct?

a. Their cell walls contain peptidoglycan.
b. Most are pathogens.
X c. Many are extremophiles.
d. They have no traits in common with eukaryotic cells.

MM.7 Which gas was originally missing in the Miller-Urey experiments

a. Methane (CH_4)
b. Hydrogen (H_2)
c. Ammonia (H_3)
X d. Carbon dioxide (CO_2)
e. None of the above.

MM.8 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

MM.9 The major structural component of bacterial cell walls is

a. proteoglycan.
X b. peptidoglycan.
c. cellulose.
d. arabinogalactan.

MM.10 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

MM.11 In bacteria the purpose of the sex pilus is to

a. allow transfer of gametes.
b. form a gap junction and conjugate.
X c. facilitate DNA exchange.
d. stabilize a network of bacterial cells

MM.12 This number of proteins in a bacterial flagellum is the same across all different types.

a. 30
b. 23
X c. 40
d. 10

MM.13 A group of interbreeding individuals in a specific geographical location is called a

a. ecosystem.
X b. population.
c. community.
d. species.
e. gene pool.

MM.14 Photosynthesis by _____ was responsible for the accumulation of oxygen in the atmosphere of early Earth.

a. green bacteria
X b. cyanobacteria
c. Gram-positive bacteria
d. chlamydias

MM.15 The Hardy-Weinberg principle of genetic equilibrium tells us what to expect when a sexually reproducing population is
a. evolving.
b. decreasing with each generation.
c. increasing with each generation.
X d. not evolving.
e. migrating.

MM.16 Protobionts (protocells) are
a. a group of abiotically produced innorganic molecules surrounded by a membrane-like structure.
X b. a group of abiotically produced organic molecules surrounded by a membrane-like structure .
c. a group of biotically produced innorganic molecules surrounded by a membrane-like structure.
d. a group of biotically produced organic molecules surrounded by a membrane-like structure.

MM.17 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.

MM.18 When a retrovirus infects a host cell, reverse transcriptase copies the _____ viral genome into a _____ copy, which is inserted into the host cell genome.
a. double-stranded RNA; double-stranded DNA
b. single-stranded RNA; single stranded DNA
X c. single-stranded RNA; double-stranded DNA
d. single-stranded DNA; double-stranded DNA

MM.19 Some viruses contain an envelope, which is made of materials derived from _____.
a. the virus cell membrane
b. bacterial cell walls
X c. the host cell's membrane
d. animal cell walls

MM.20 If a storm kills many small sparrows in a population, but only a few medium-sized and no large ones, which type of selection is probably operating?
X a. directional selection
b. stabilizing selection
c. disruptive selection
d. neutral selection

MM.21 Which of the following does the neutral mutation hypothesis propose?
a. Complex structures in most organisms have not been fostered by neutral selection.
b. Most mutations have a strongly harmful effect.
X c. Some mutations are not affected by natural selection.
d. Large populations are subject to stronger natural selection than small populations.

MM.22 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

MM.23 Approximately how far back in time does the fossil record extend?
X a. 3,500,000,000 years
b. 3,500,000 years
c. 5,000,000,000,000 years
d. 6,000 years
e. 6,000,000 years

MM.24 Which of the following best defines a virus?
a. a naked fragment of nucleic acid
b. a disease-causing group of proteins
X c. an entity composed of proteins and nucleic acids
d. an entity composed of proteins, nucleic acids, and ribosomes

MM.25 The first genes on Earth were probably
a. RNA produced by autocatalytic, proteinaceous enzymes.
X b. auto-catalytic RNA molecules.
c. oligopeptides located within protocells.
d. DNA molecules whose information was transcribed to RNA and later translated in polypeptides.
e. DNA produced by reverse transcriptase from abiotically produced RNA.

MM.26 What gives rise to the cohesiveness of water molecules?
a. ionic bonds
X b. hydrogen bonds
c. hydrophobic interactions
d. nonpolar covalent bonds
e. both hydrophobic interactions and ionic bonds