

BIO 1130MM

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

Saturday, November 9, 2013

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

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Multiple choice questions - Place your answers on the answer sheet

MM.1 A Gram-positive bacterium is characterized by the

- a. presence of a thick cell wall.
- b. absence of ribosomes.
- c. absence of a cell wall.
- d. presence of an outer membrane.

MM.2 The enzyme reverse transcriptase is used by HIV viruses to catalyze the synthesis of _____.

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

MM.3 If a species arose through anagenesis, then its ancestral species must have _____.

- a. gone extinct
- b. continued to survive alongside the new species
- c. gradually become a new species
- d. left no trace in the fossil record

MM.4 The presence of branched membrane lipids, with ether linkages is characteristic of

- a. Archaea only.
- b. Bacteria only.
- c. neither Archaea nor Bacteria.
- d. both Archaea and Bacteria.

MM.5 Prokaryotes adapt to environmental changes more quickly than eukaryotes because they have _____.

- a. a lower mutation rate
- b. smaller populations
- c. the ability to transfer genes between individuals
- d. longer generation times

MM.6 The cladistic approach to estimating phylogenetic trees is most like the approach of which species concept?

- a. Biological species concept
- b. Morphospecies concept
- c. Phylogenetic species concept

MM.7 Which of the following movements are matched correctly with the appendage that facilitates that movement in protists?

- a. cell crawling; flagella
- b. cell crawling; cilia
- c. swimming; pseudopodia
- d. swimming; flagella

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MM.8 Which of the following correctly describes a viroid?

- a. the smallest type of virus
- b. the small infectious pieces of DNA
- X c. the small infectious pieces of RNA**
- d. the infectious pieces of RNA wrapped in a protein coat

MM.9 Which of these is the most common compound in the cell walls of gram-positive bacteria?

- a. lignin
- b. protein
- c. lipopolysaccharide
- X d. peptidoglycan**
- e. cellulose

MM.10 Which of the following describes the most likely order of events in speciation?

- a. divergence, genetic isolation, genetic drift
- X b. genetic isolation, genetic drift, divergence**
- c. genetic isolation, divergence, genetic drift
- d. divergence, genetic drift, genetic isolation
- e. genetic drift, genetic isolation, divergence

MM.11 Which of the following protists causes the human disease malaria?

- X a. *Plasmodium***
- b. *Trichomonas*
- c. *Giardia*
- d. *Leishmania*

MM.12 Which of the following structures is characteristic of a gram-negative bacterial cell, but not of a gram-positive bacterial cell?

- a. capsule
- X b. outer membrane**
- c. cell wall made mostly of peptidoglycan
- d. single-layered cell wall

MM.13 Which of the following statement about the bacterial flagellum is false?

- a. It rotates.
- b. It is composed of rigid helical proteins.
- c. It is propelled by an ion gradient.
- d. It evolved as an analogous structure to the eukaryotic flagellum.

There is no correct answer, all of these statements are true. No mark will be assumed for this question and the MM exam is out of 25 instead of 26 points.

MM.14 Land plants are thought to have evolved via a pathway of _____.

- a. primary endosymbiosis during which a prokaryotic cell engulfed a photosynthetic cyanobacterium
- b. secondary endosymbiosis during which a nonphotosynthetic eukaryote engulfed a red algae
- X c. primary endosymbiosis during which a eukaryotic cell engulfed a photosynthetic cyanobacterium**
- d. secondary endosymbiosis during which a nonphotosynthetic eukaryote engulfed a green alga ancestor

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- MM.15 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. choanoflagellates
- MM.16 Which of the following could be a vicariance event for species in that habitat?
- a. Radiation near Chernobyl increases mutation rate, causing an increase in autopolyploidy.
 - X** b. The level of water in a lake recedes, creating two lakes where there used to be one.
 - c. Some insects get blown in a storm to a new mountain range, where they lay eggs.
 - d. All of the above could be vicariance events for species in that habitat.
- MM.17 Protists include cells that _____.
- a. live independently
 - b. form colonies
 - c. make up multicellular organisms
 - X** d. all of the choices
- MM.18 Collapsing red suns explode huge amounts of this element into the universe
- a. Helium
 - b. Hydrogen
 - X** c. carbon
 - d. Silica
- MM.19 The biological species concept cannot be applied to two possibly different species that are _____.
- X** a. asexual
 - b. sexual
 - c. similar
 - d. plants
- MM.20 How can prokaryotes be considered to be more successful on Earth than humans?
- a. Prokaryotes are more diverse in metabolism.
 - b. Prokaryotes occupy more diverse habitats.
 - c. Prokaryotes are much more numerous and have more biomass.
 - d. Prokaryotes occupy more diverse habitats and are more diverse in metabolism.
 - X** e. Prokaryotes are much more numerous, have more biomass, occupy more diverse habitats, and are more diverse in metabolism.
- MM.21. Adjacent populations producing hybrid offspring with low relative fitness may be undergoing
- a. clinal isolation
 - X** b. parapatric speciation
 - c. allopatric speciation
 - d. sympatric speciation
- MM.22 Which of the following statements accurately describes a plasmid?
- a. It can only replicate when the cell's chromosome replicates.
 - b. It is a small circular piece of RNA outside a cell's chromosome.
 - X** c. It is a small circular piece of DNA outside a cell's chromosome.
 - d. It refers to a piece of DNA taken up from the environment by a prokaryotic cell.

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- MM.23 Though plants, fungi, and prokaryotes all have cell walls, we place them in different taxa. Which of these observations comes closest to explaining the basis for placing these organisms in different taxa, well before relevant data from molecular systematics became available?
- a. Some closely resemble animals, which lack cell walls.
 - b. Some have cell walls only for support.
 - c. Some have cell walls only for protection from herbivores.
 - X** d. Their cell walls are composed of very different biochemicals.
 - e. Some have cell walls only to control osmotic balance.
- MM.24 Total number of microtubular strands surrounding the central core of a centrosome.
- a. 9
 - b. 11
 - c. 18
 - X** d. 27
 - e. 28
- MM.25 Number of possible different gametes in a eukaryote with 5 pairs of chromosomes.
- a. 5
 - b. 8
 - c. 10
 - X** d. 32
 - e. 64
- MM.26 Cytoskeletal microtubules are composed of this protein.
- a. actin
 - b. myosin
 - c. kinesin
 - X** d. tubulin
 - e. dyenin