BIO 1130FF

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

Saturday, November 8, 2014

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

FF.1 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.

FF.2 Theoretically, the production of sterile mules by interbreeding between female horses and male donkeys should

a. cause convergent evolution.
b. weaken the intrinsic reproductive barriers between horses and donkeys.
c. eventually result in the formation of a single species from the two parental species.
X d. strengthen postzygotic barriers between horses and donkeys.
e. result in the extinction of one of the two parental species.

FF.3 The snake family Typhlopidae consists of small, burrowing species with vestigial eyes. They are found in Australia, sub-Saharan Africa, India and some adjacent areas, and South America. What is the most likely explanation for this distribution?

a. rafting to the different continents from the point of origin on one of these continents
X b. origin on the super continent Gondwana followed by continental drift and some range expansion
c. convergent evolution in the different regions
d. all of the above

FF.4 The purple non-sulfur bacterium *Rhodospirillum* grows best as a photoheterotroph. What are the most favorable sources of energy and carbon for this bacterium?

a. glucose
b. light and CO_2
X c. fructose and light
d. methane and CO_2

FF.5 Microbiologists use the Gram stain to aid in identification of bacteria. What is the major difference between Gram-positive and Gram-negative bacteria?

a. structure of the lipids in the plasma membrane
b. presence or absence of muramic acid in the cell wall
X c. presence or absence of outer membrane
d. presence or absence of peptidoglycan in the cell wall

FF.6 Which of the following is not characteristic of ciliates?

a. They have two or more nuclei.
b. Most live as solitary cells in fresh water.
c. They are relatively complex cells.
d. They use cilia as locomotory structures or as feeding structures.
X e. They can exchange genetic material with other ciliates by the process of mitosis.

FF.7 An early consequence of the release of oxygen gas by plant and bacterial photosynthesis was to

a. change the atmosphere from oxidizing to reducing.
b. prevent the formation of an ozone layer.
c. make life on land difficult for aerobic organisms.
d. make it easier to maintain reduced molecules.
X e. cause iron in ocean water and terrestrial rocks to rust (oxidize).

FF.8 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.

FF.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

FF.10 Consider the following data: (a) Most ancient eukaryotes are unicellular. (b) All eukaryotes alive today have a nucleus and cytoskeleton. (c) Most ancient eukaryotes lack a cell wall. Which of the following conclusions could reasonably follow the data presented?

a. The first eukaryote may have been photosynthetic.
b. The first eukaryote may have been anaerobic.
X c. The first eukaryote may have been capable of phagocytosis.
d. The first eukaryote may have been very similar to a plant cell.

FF.11 Male frogs give calls that attract female frogs to approach and mate. Researchers examined mating calls of closely related tree frogs in South America. What outcomes can occur where the ranges of two species overlap?

a. The species will interbreed, eventually fusing over time.
b. A stable hybrid zone will form if hybrids are better adapted to the area of overlap than either parent species is.
c. Species will continue to diverge and be isolated by behavioral or genetic mechanisms.
X d. All of the above is possible outcomes.
e. None of the above is a possible outcome

FF.12 Which of the following is a structure that permits bacterial conjugation to occur?

a. endospore
b. cell wall
X c. sex pilus
d. flagellum
e. capsule

FF.13 Carbon is an important element for biology because

a. It has the ability to form six covalent bonds.
X b. Of the variety of carbon skeletons and functional groups that can be built on them.
c. Carbon is so rare, organisms conserve it highly.
d. It has very high electronegativity and forms highly stable bonds.

FF.14 If two species of lizards do not mate because their mating rituals differ greatly, this is known as
a. ecological isolation.
b. mechanical isolation.
c. temporal isolation.
X d. behavioural isolation.

FF.15 Which of the following statements about the lysogenic cycle of a phage is false?
X a. After infection the viral genes immediately turn the host cell into a virus-producing factory, and the host cell then lyses.
b. The phage DNA is incorporated into the host cell's DNA.
c. The phage genome replicates along with the host genome.
d. Certain environmental triggers can cause the phage to exit the host genome, switching from the lysogenic to the lytic cycle.

FF.16 Which of the following events marks the start of the Proterozoic eon?
a. explosion of marine invertebrates and multicellular life
b. The dominance of anaerobic life
X c. A stable oxygen environment and the appearance of protists
d. The origins of life

FF.17 Meteorite impacts during the stabilizing phase of the Hadean Eon did which of the following
a. increased the amount of water on the planet
b. flash sterilized the planet
c. created the moon that circles the earth
X d. all of the above

FF.18 This heavy metal is abundant in the core of the earth and the other planets closest to the sun
a. Lead
b. Silica
X c. Iron
d. Copper

FF.19 The process by which bacterial genes from one bacterium are transferred to another via a virus is called _____.
a. translation
b. transformation
X c. transduction
d. transcription

FF.20 An organism that obtains its energy from sunlight is a(n)
X a. phototroph.
b. chemotroph.
c. autotroph.
d. heterotroph.

FF.21 Which organisms represent the common ancestor of all photosynthetic plastids found in eukaryotes?

a. autotrophic euglenids
b. red algae
c. dinoflagellates
d. diatoms
X e. cyanobacteria

FF.22 Viroids are defined as _____.

a. proteinaceous infectious particles
b. plant pathogens that consist of strands or circles of DNA
c. strands or circles of RNA with a protein coat
X d. infective RNAs made of strands or circles of naked RNA

FF.23 Imagine that you are given some chemoorganotrophic bacteria to grow. What should you use as a source of energy for this type of bacteria?

X a. sugar
b. ammonia
c. light
d. methane
e. any of the above

FF.24 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.

FF.25 Earth is approximately _____ years old.

a. 3.6 billion
b. 2.6 million
c. 1 billion
X d. 4.6 billion

FF.26 Many scientific probes sent to other parts of the solar system are looking for signs of something so far known to exist only on Earth, namely _____.

X a. Life.
b. Carbon.
c. Gold.
d. Nitrogen.
e. Water