# BIO 1130MM

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

**Saturday, November 13, 2010**

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

a) 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.

b) 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.

c) Do not place any answers on the question sheet.

d) This is not an open book exam.

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

f) **You do not need a calculator for this exam**

**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

1.1 A _____ is an extension of a lobe of the cytoplasm, which is used by some protists for movement.

X a. pseudopod
b. gullet
c. pilus
d. cilium

1.2 According to the endosymbiotic theory, why was it adaptive for the larger (host) cell to keep the engulfed cell alive, rather than digesting it as food?

a. The host cell was able to survive anaerobic conditions with the engulfed cell alive.
X b. The engulfed cell provided the host cell with ATP.
c. The engulfed cell provided the host cell with carbon dioxide.
d. The engulfed cell allowed the host cell to metabolize glucose.
e. The host cell would have been poisoned if it had digested the engulfed cell.

1.3 Amoebas use pseudopodia for movement and

a. excretion.
X b. feeding.
c. asexual reproduction.
d. avoiding predation.

1.4 An organism that obtains its carbon from $CO_2$ is a(n)

a. chemotroph.
X b. autotroph.
c. heterotroph.
d. auxotroph.

1.5 Bacteria participate in the nitrogen cycle through which mechanism?

a. nitrification
b. nitrogen fixation
c. decomposition
d. denitrification
X e. all of the above

1.6 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
X d. an individual's phenotype
e. a species' gene frequency

1.7 Cephalization is primarily associated with

a. method of reproduction.
b. fate of the blastopore.
c. adaptation to dark environments.
d. type of digestive system.
X e. bilateral symmetry.

1.8 Four of the five processes below are components of natural selection. Select the EXCEPTION.

X a. genetic drift
b. genetic variation
c. limitations in vital resources
d. differential reproductive success
e. overproduction of offspring

1.9 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.

1.10 If archaeans are more closely related to eukaryotes than to bacteria, then which of the following is a reasonable prediction?

a. Archaean DNA should be single-stranded.
b. Archaeans should lack cell walls.
c. Archaean chromosomes should have no protein bonded to them.
X d. Archaean ribosomes should be larger than typical prokaryotic ribosomes.
e. Archaean DNA should have no introns.

1.11 In a Hardy-Weinberg population with two alleles, A and a, that are in equilibrium, the frequency of the allele a is 0.4. What is the percentage of the population that is homozygous for this allele?

a. 4
b. 36
c. 40
X d. 16
e. 32

1.12 In bacterial transformation, cells

a. make replicate copies of one another.
X b. take up pieces of DNA that are released as other cells disintegrate.
c. take up pieces of DNA through infection of a virus.
d. replicate DNA molecules.

1.13 In most metazoans the outermost tissue layer during development is the

X a. ectoderm.
b. mesoderm.
c. epiderm.
d. endoderm.

1.14 In terms of food capture, which sponge cell is most similar to the cnidocyte of a Cnidarian?

X a. choanocyte
b. epidermal cell
c. gamete
d. zygote
e. pore cell

1.15 Which structure is the site of the synthesis of proteins that may be exported from the cell?

X a. rough ER
b. Golgi vesicles
c. lysosomes
d. tight junctions
e. plasmodesmata

1.16 Prokaryotes were split into two domains based on differences in

a. cell wall composition.
b. cell membrane properties.
X c. rRNA sequences.
d. staining characteristics.

1.17 Secondary endosymbiosis occurs when a

a. non-photosynthetic eukaryote engulfs a photosynthetic prokaryote.
b. photosynthetic eukaryote engulfs a photosynthetic prokaryote.
c. photosynthetic eukaryote engulfs a non-photosynthetic prokaryote.
X d. non-photosynthetic eukaryote engulfs a photosynthetic eukaryote.

1.18 The blastopore denotes the presence of an endoderm-lined cavity in the developing embryo, a cavity that is known as the

X a. archenteron.
b. germ layer.
c. blastocoel.
d. blastula.
e. coelom.

1.19 The DNA of an organism is studied and found to contain 30% adenine. Based on this you would predict that the DNA of this organism also contains 30%

X a. thymine.
b. cytosine.
c. each of thymine and guanine.
d. each of cytosine and guanine.

1.20 The genome of prokaryotes consists of

a. many linear DNA molecules.
b. multiple circular DNA molecules.
X c. a single DNA molecule that may be circular or linear, depending on the species.
d. a single linear DNA molecule.

1.21 The only survivors of a colony on Venus are a man and a woman, who happen to be both originally from southern Ukraine. Their descendants will show the effect of

a. excessive mutation.
b. punctuated equilibrium.
c. heterozygote advantage.
X d. genetic drift.
e. frequency-dependent selection.

1.22 The protists are a diverse group of organisms that have traditionally been grouped together because they all

X a. are not prokaryotes, fungi, plants, or animals.
b. have very similar DNA sequences.
c. have very similar shapes.
d. have the same type of nutrition.

1.23 The three domains of life are

a. Archaebacteria, Eubacteria, and Eukaryota.
b. Prokaryota, Eukaryota, and Protoctista.
X c. Archaea, Bacteria, and Eukarya.
d. animals, plants, and microorganisms.

1.24 The width of a DNA double helix

a. is narrower where adenine is present than where cytosine is present.
b. is wider where purines are present than where pyrimidines are present.
c. varies randomly.
X d. is constant.

1.25 What is the major goal of cellular respiration?

a. supply cell with fixed carbon
b. generate O2
X c. produce ATP
d. reduce an electron acceptor molecule
e. All of the above answers apply.

1.26 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

1.27 Which is one of the main energy transformers of cells?

a. Golgi apparatus
b. lysosome
c. peroxisome
d. vacuole
X e. mitochondrion

1.28 Which of the following adds individual nucleotides to the 3' end of an existing strand to build a new DNA strand during DNA replication?

a. helicase
b. topoisomerase
X c. DNA polymerase
d. primase

1.29 Which of the following best describes the composition of a the simplest type of viral particle?

a. nucleic acid + capsid + protein spikes
b. nucleic acid + envelope
X c. nucelic acid + capsid
d. nucleic acid only

1.30 Which of the following traits do archaeans and bacteria share?

1. composition of the cell wall
2. presence of plasma membrane
3. lack of a nuclear envelope
4. identical rRNA sequences

a. 2 and 4
b. 3 only
X c. 2 and 3
d. 1 and 3
e. 1 only