BIO 1130FF

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

Saturday, November 12, 2011

Part A: Multiple choice questions
30 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 Members of this Mollusc class have a pair of shells that are hinged together.
a. Polyplacophora
b. Cephalopoda
c. Bivalvia
d. Scaphopoda

FF.2 The presence of a single, circular chromosome is characteristic of
a. neither Archaea nor Bacteria.
b. both Archaea and Bacteria.
c. Bacteria only.
d. Archaea only.

FF.3 The DNA of an organism is studied and found to contain 14% guanine. This organism should have ____% thymine and ____% cytosine in its DNA.
a. 36; 14
b. 14; 36
c. 36; 36
d. 14; 86

FF.4 What do all the Lophotrochozoa phyla have in common?
a. They have trochophore larvae, which swim with the aid of a ring of cilia.
b. They expand their bodies continuously during growth.
c. They have members that reproduce sexually and members that reproduce asexually.
d. They feed using lophophores, specialized ciliated structures.
e. None of the above answers is correct.

FF.5 Suppose all of the suspension (filter) feeders were removed from a lake. What would you expect to happen after a brief period of time?
a. The water would remain the same.
b. The water would become clearer.
c. The water would become murkiy and cloudy.

FF.6 Arrange the following layers of a gram-negative bacteria from most external to most internal.
1 = cell membrane, 2 = capsule and 3 = cell wall

a. 3, 1, 2
b. 2, 1, 3
c. 2, 3, 1
d. 1, 2, 3

FF.7 Many physicians administer antibiotics to patients at the first sign of any disease symptoms. Why can this practice cause more problems for these patients, and for others not yet infected?
a. Overuse of antibiotics can select for antibiotic-resistant strains of bacteria.
b. Antibiotics may interfere with the ability to identify the bacteria present.
c. Antibiotics may cause other side effects in patients.
d. The antibiotic administered may kill viruses that had been keeping the bacteria in check.
e. Particular patients may be allergic to the antibiotic.

FF.8 If this structure connects the cytoplasm of two Gram-positive bacteria, one of these cells may gain new genetic material:
a. cell wall
b. sex pilus
c. capsule
d. flagellum
e. endospore

FF.9 Which of the following describe all existing bacteria?
a. small, harmful, fast-growing
b. tiny, ubiquitous, metabolically diverse
c. pathogenic, omnipresent, morphologically diverse
d. extremophiles, tiny, abundant
e. all of the above

FF.10 Where did the first oxygen come from?
a. fermentation
b. anaerobic respiration
c. aerobic respiration
d. oxidizing water

FF.11 Each DNA nucleotide is made up of
a. a six-carbon sugar, a nitrogenous base, and one of four amino acids.
b. a five-carbon sugar, a phosphate group, and one of four nitrogenous bases.
c. a five-carbon sugar, a nitrogenous base, and one of twenty amino acids.
d. a six-carbon sugar, a phosphate group, and one of twenty amino acids.
e. a five-carbon sugar, a phosphate group, and one of four amino acids.

FF.12 What organisms are most numerous on Earth?
a. eukaryotes
b. insects
c. archaea
d. plants
e. prokaryotes

FF.13 The three domains of life are
a. Archaebacteria, Eubacteria, and Eukaryota.
b. Prokaryota, Eukaryota, and Protoctista.
c. Archaea, Bacteria, and Eukarya.
d. animals, plants, and microorganisms.

FF.14 The muscles of the body wall are derived mainly from which embryonic cell layer in most metazoans?
a. mesoderm
b. ectoderm
c. mesoglea
d. endoderm

FF.15 In transduction, bacterial cells
a. make replicate copies of one another.
b. replicate DNA molecules.
c. take up pieces of DNA that are released as other cells disintegrate.
d. take up pieces of DNA through the use of a virus.

FF.16 Which of the following statements about prokaryotes is FALSE?
a. They lack a true nucleus.
b. They are found only in certain very specific niches and habitats.
c. They are generally smaller than eukaryotes.
d. They have a wide range of metabolic activities.

FF.17 The most ancient branch point in animal phylogeny is that between having
a. diploblastic or triploblastic embryos.
b. a body cavity or no body cavity.
c. radial or bilateral symmetry.
d. true tissues or no tissues.
e. a well-defined head or no head.

FF.18 In bacterial transformation, cells
a. make replicate copies of one another.
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.

FF.19 Which of the following best describes the composition of a simplest type of viral particle?
a. nucleic acid + capsid + protein spikes
b. nucleic acid + envelope
c. nucelic acid + capsid
d. nucleic acid only

FF.20 Members of this Mollusc class include octopuses, squids, and nautiluses.
a. Polyplacophora
b. Cephalopoda
c. Gastropoda
d. Bivalvia

FF.21 Protostomes with a unique layer of tissue called the mantle that may secrete a shell are part of which phylum?
a. Arthropoda
b. Annelida
c. Cnidaria
d. Echinodermata
e. Mollusca

FF.22 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 CO2
c. fructose and light
d. methane and CO2

FF.23 What is a major difference between mitosis and meiosis I?
a. DNA replication takes place prior to mitosis, but not before meiosis I.
b. Only meiosis I results in daughter cells that contain identical genetic information.
c. Prophase is longer and more complex in mitosis.
d. Sister chromatids separate in mitosis, and homologues separate in meiosis I.

FF.24 Tube feet of sea stars and the bodies of cnidarians are all supported by
a. only nonskeletal structures.
b. an exoskeleton.
c. a hydrostatic skeleton.
d. an endoskeleton.

FF.25 Bacteria and Archaea are most easily distinguished from each other by their:
a. reproduction method.
b. chromosome structure.
c. transcription and translation mechanism.
d. habitat.

FF.26 Which of the following statements about the sporophyte in brown algae is TRUE?
a. It is haploid and gives rise to spores by mitosis.
b. It is diploid and gives rise to spores by mitosis.
c. It is haploid and gives rise to spores by meiosis.
d. It is diploid and gives rise to spores by meiosis.

FF.27 Animals that have a fluid-filled cavity that separates the gut from the muscles of the body wall and have that cavity completely lined by the mesoderm are said to be
a. mesenteries.
b. coelomate.
c. pseudocoelomate.
d. indeterminate.

FF.28 Among protostomes, which morphological trait has shown the most diversity?
a. type of body cavity (coelom vs. pseudocoelom vs. acoelom)
b. type of symmetry (bilateral vs. radial vs. none)
c. direction of gastrulation (protostome vs. deuterostome)
d. number of embryonic tissue types (diploblasty vs. triploblasty)

FF.29 Which of the following does not contribute to prokaryotic genetic variability?

a. binary fission
b. gene transfer by conjugation
c. mutation
d. gene transfer by transformation

FF.30 How do the daughter cells at the end of mitosis and cytokinesis compare with their parent cell when it was in G1 of the cell cycle?

a. The daughter cells have the same number of chromosomes and twice the amount of DNA.
b. The daughter cells have half the number of chromosomes and half the amount of DNA.
c. The daughter cells have the same number of chromosomes and the same amount of DNA.
d. The daughter cells have half the amount of cytoplasm and half the amount of DNA.
e. The daughter cells have the same number of chromosomes and half the amount of DNA.

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Part B: Written questions

a) Place your name and student number in the space provided below. Be sure that your student number is on the top of each of the following pages – the exam will be separated. ONLY place your student number on the pages where indicated

b) Answer all questions in the space provided on the exam. Do not transfer answers to the back of the page.

c) You may use either pencil of ink for your answers.

d) Answers as written paragraphs are preferred but point form is acceptable as long as the points are logically organized and not random statements or facts

e) This is not an open book exam.

f) There are five pages including this one in part B of the exam, be sure you have all five pages.

g) Enter the multiple choice exam code in the space provided

Name: _____

Student number: _____

Multiple Choice Exam Code (MM or FF): _____

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12 pts Part 1. Briefly explain what each of the following terms means or the biological contribution made by the person. Where possible include an example in your explanation from a group or an organism to which the term or name applies.

Primary endosymbiotic theory

Gametophyte

Sporozoite

Radial cleavage

26 pts Part 2: Fill in the missing word, or provide the one word answer in the space provided at the end of the sentence. If the line is missing, add it to the end of the line.

2.1 Sponges are called this type of feeder because they do this to the water that they pump. _____

2.2 An explosion in different types of multicellular animals identifies this era starting approximately 540 MYA. _____

2.3 The levels of this greenhouse gas fluctuate dramatically near the end of the Proterozoic Eon alternating between low levels and a frozen planet and high levels (Two words). _____

2.4 The number of microtubular strands in the center of either a cilium or a flagellum. _____

2.5 Other than lightning, this process is the only way to get nitrogen into organic molecules. (Two words) _____

2.6 Number of different modified sugars that are found in peptidoglycan. _____

2.7 The reinforcing material in the bacterial cell wall consists of long chains of polysaccharide and side chains made of this material. _____

2.8 Large brown algae, like kelp, are still not considered multicellular because there is no division of labour between the cells beyond specialized cells associated with this activity. _____

2.9 Swamp gas, natural gas, and bovine flatulence all have this archaean produced gas in common. _____

2.10 The unique molluscan feeding structure. _____

2.11 Sponges are organized at the cellular grade and don't have cells organized as these. _____

2.12 Bacterial reproduction where plasmids carry pieces of one bacterial genome and combine it with another's. _____

2.13 The number of Arthropod phyla that survive the extinction at the end of the Cambrian.

2.14 In the bacterial flagellum protons flow through which protein complex when then rotates flagellum. _____

2.15 A larval echinoderm has this type of symmetry. _____

2.16 As an antibiotic penicillin affects which part or layer of the bacterial cell wall . _____

2.17 This anchors the bacterial flagellum to the biological motor underneath. _____

2.18 The gram positive bacteria have a bilayer of this compound as their outermost layer. _____

2.19 In this stage of the viral life cycle the viral genome is combined with the bacterial. _____

2.20 Form of the genetic material in a retrovirus. _____

2.21 Simple bacterial cell duplication (two words). _____

2.22 The three carbon compound that mitochondria use as a high energy compound. _____

2.23 The term used to describe the side of a medusa opposite the mouth. _____

2.24 The new geological period that preceeds the Cambrian. _____

2.25 Bacteria that get carbon from organic sources and energy from light. _____

2.26 The number of Arthropod phyla that survive the extinction at the end of the Cambrian. _____

Part three of the exam is on the next page

12 pts Part 3: Answer the following two questions in the space provided.

Mesoderm and the coelom were major innovations in Animal architecture. There are two different ways that these form and these differences, in part, define the protostome and deuterostome lineages. Describe how mesoderm and the coelom form in the Protostomia.

In protists molecular motors are used in locomotion. Describe how the molecular motor works in an amoeba.