BIO 1130FF

An Introduction to Organismal biology
Final examination
Worth 35% of your final grade

Friday, December 13, 2010

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

a) 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.

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**

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

1. Lignified, tubelike structures that branch throughout the body of some plants, conducting water and solutes, are called ____.
   a. vascular tissues
   b. root systems
   c. apical meristems
   d. shoot systems
   e. rhizomes

2. Which of the following types of land plants are the only ones to make true flowers and fruits?
   a. gymnosperms
   b. angiosperms
   c. bryophytes
   d. seedless vascular plants

3. An advancement that reptiles show over amphibia is
   a. A tough scaly skin that provides protection against desiccation.
   b. Lungs that can be ventilated by movements of the thoracic cavity
   c. A shelled egg that can be laid on land
   d. All of these

4. What is generally true of two very closely related species that have diverged from each other quite recently?
   a. They are unable to produce hybrid offspring upon interbreeding.
   b. They shared a common ancestor recently in evolutionary time.
   c. Genes are unable to pass from one species' gene pool to the other's gene pool.
   d. Their reproductive isolation from each other is complete.

5. Which of the following lineages contains all of the rest of the lineages in the list?
   a. Gnathostomata
   b. Amniota
   c. Vertebrata
   d. Tetrapoda

6. The most direct ancestors of modern plants were
   a. cyanobacteria.
   b. animals.
   c. fungi.
   d. sponges.
   e. green algae.

7. Along with lipids, the skin of amniotes is filled with ____ to help prevent water loss.
   a. keratin
   b. albumin
   c. collagen
   d. bone

8. Boney fishes regulate buoyancy by precisely regulating the volume of gas in the
   a. stomach.
   b. gills.
   c. body tissues.
   d. pyloric cecum.
   e. swim bladder.

9. A mule is an example of
   a. temporal isolation.
   b. hybrid inviability.
   c. hybrid sterility.
   d. mechanical isolation.

10. In an amniotic egg where is the embryo found?
   a. just inside the outer shell or membrane
   b. directly within the albumen
   c. inside the amnion.
   d. just outside the membrane containing the albumen

11. A biologist discovers two populations of wolf spiders whose members appear identical. Members of one population are found in the leaf litter deep within the woods. Members of the other population are found in the grass at the edge of the woods. The biologist decides to designate the members of the two populations as two separate species. Which species concept is this biologist most closely utilizing?
   a. morphological
   b. ecological
   c. biological
   d. phylogenetic

12. Gene flow between organisms of ring species occurs
   a. only under laboratory conditions.
   b. never.
   c. between any of the organisms if they are placed in the same environment.
   d. only between adjacent populations.

13. Phylogenetic hypotheses (such as those represented by phylogenetic trees) are strongest when
   a. they are supported by more than one kind of evidence, such as when fossil evidence corroborates molecular evidence.
   b. they are based on a single DNA sequence that seems to be a shared derived sequence.
   c. they are accepted by the foremost authorities in the field, especially if they have won Nobel Prizes.
   d. they are based on amino acid sequences from homologous proteins, as long as the genes that code for such proteins contain no introns.
   e. each clade is defined by a single derived character.

14. Mammals are thought to be living descendants of which of the following lineages?
   a. archosaurs
   b. lepidosaurs
   c. anapsids
   d. synapsids

15. Members of the arthropod subphylum _____ were a dominant form of life in oceans from the Cambrian period to the Carboniferous period.
    a. Uniramia
    b. Crustacea
    c. Mandibulata
    d. Trilobita
    e. Chelicerata

16. How are gymnosperms and angiosperms similar?
    a. Plants in both groups lack vascular tissue.
    b. Plants in both groups produce seeds and pollen.
    c. Plants in both groups have cones that produce pollen and seeds.
    d. Plants in both groups have flowers and fruits.

17. The concept for examining speciation by reconstructing the evolutionary tree is the
    a. examination of clinal variation.
    b. morphological species concept.
    c. phylogenetic species concept.
    d. biological species concept.

18. Insect dominance is probably due to the evolution of
    a. flight.
    b. cephalization.
    c. the exoskeleton.
    d. metamerism.
    e. jointed appendages.

19. Which of the following is a unique, derived trait that is present in all birds?
    a. migration
    b. four-chambered heart
    c. feathers
    d. ability to fly

20. The female gametophyte in flowering plants is usually which of the following?
    a. shoot parts bearing female flowers
    b. eight cells embedded in floral tissues
    c. the complete pistil
    d. a single ovary

21. The process in fungi that allows nutrients to flow from food-absorbing parts of the fungal body to other, nonabsorptive parts is
    a. osmosis.
    b. symbiosis.
    c. cytoplasmic streaming.
    d. plasmogamy.

22. On a cladogram, the tips of the branches represent
    a. groups of organisms that share a common ancestor.
    b. common characters.
    c. distinguishing characters.
    d. common ancestors.

23. The most primitive of the early fishes were the
    a. agnathans.
    b. gnathostomes.
    c. acanthodians.
    d. lobe-finned fishes.
    e. boney fishes.

24. Which of the following is a unique, derived trait that is present in all birds?
    a. migration
    b. four-chambered heart
    c. feathers
    d. ability to fly

25. You are confronted with a box of preserved grasshoppers of various species that are new to science and have not been described. Your assignment is to separate them into species. There is no accompanying information as to where or when they were collected. Which species concept will you have to use?
    a. ecological
    b. morphological
    c. phylogenetic
    d. biological

26. In the pine life cycle, fertilization often takes place ____ pollination.
    a. at the same time as
    b. a few weeks after
    c. a few days before
    d. months to a year after

27. The class Reptilia is considered to be ____ because the group contains species that share a common ancestor, but does not include all of that ancestor's descendants.
    a. a mosaic
    b. polyphyletic
    c. paraphyletic
    d. an outgroup

28. A nontaxonomic designation that applies to all vertebrates except fishes is _____ (adaptations to life on land are found in some members of any group of this designation).
    a. tetrapod
    b. gnathostome
    c. apod
    d. agnatha
    e. amniote

29. These are small passages through the cuticle in plants that can open and close, allowing for some control of water loss by evaporation. In plants that have them, they are the main route for uptake of carbon dioxide.
    a. thalli
    b. stomata
    c. gemmae
    d. sporopollenins
    e. tracheophytes

30. An example of mechanical isolation would be
    a. two organisms that have different mating rituals.
    b. two organisms that are pollinated by different insects.
    c. two organisms that have different habitats.
    d. two organisms that have incompatible gametes.

31 Reptiles of the lineage _____ lack opening in the temporal region of the skull.
    a. synapsid
    b. diapsid
    c. amphiapsid
    d. triapsid
    e. anapsid

32. A defining characteristic of allopatric speciation is
    a. artificial selection.
    b. asexually reproducing populations.
    c. geographic isolation.
    d. the appearance of new species in the midst of old ones.
    e. large populations.

33. Which of the following terms refers to a young moss gametophyte?
    a. capsule
    b. antheridium
    c. protonema
    d. prothallus

34. Mosses have which of the following?
    a. true roots
    b. lignified tissue
    c. true stems
    d. true leaves
    e. none of these

35. In addition to decomposition and decay, the other major ecological role of the fungi involves
    a. producing medicines for humans.
    b. digesting ant species.
    c. assisting plants in mineral acquisition.
    d. performing photosynthesis

36. The fusion of the fungal nuclei is
a. karyogamy.
b. cytoplasmic streaming.
c. plasmogamy.
d. symbiosis

37. The development of limbs probably helped the first amphibians in
a. Finding mates
b. Running on land
c. Swimming
d. Moving between bodies of water

38. A rapid method of speciation that has been important in the history of flowering plants is
a. genetic drift.
b. behavioral isolation.
c. a mutation in the gene controlling the timing of flowering.
d. polyploidy.

39. Which of the following were the dominant land plants during the Mesozoic era, from about 250 million years ago to 65 million years ago?
a. lycophytes
b. angiosperms
c. bryophytes
d. gymnosperms

40. Which of the following statements about species, as defined by the biological species concept, is (are) correct?
I. Biological species are defined by reproductive isolation.
II. Biological species are the model used for grouping extinct forms of life.
III. The biological species is the largest unit of population in which successful reproduction is possible.
a. I, II, and III
b. II and III
c. I and III
d. I only
e. II only

41. Reptiles of the lineage _____ lack opening in the temporal region of the skull.
a. synapsid
b. diapsid
c. amphiapsid
d. triapsid
e. anapsid

42. Predatory lifestyles in gnathostomes were possible because of the development of _____
a. Jaws
b. A closed circulatory system
c. Paired fins
d. Bony armour

43. Toxic secretions in amphibians are frequently accompanied by
a. warning coloration.
b. warts and claws.
c. mimicry.
d. cryptobiosis.

44. Among insects with _____ metamorphosis, immatures are called larvae because they are very different from the adult in body form, behavior, and habitat.
a. ametabolous
b. complete
c. paurometabolous
d. incomplete

45. In their reproductive habits, the monotremes are
a. parthenogenetic.
b. oviparous.
c. viviparous.
d. ovoviparous.
e. marsupian.

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Total points for both parts of the exam is 110 pts

December 13, 2010
Part B: Written questions

a) Place your name and student number in the space provided below. Be sure only your student number, is on the top of each of the following pages – the exam will be separated and if you name is not on a page your mark will be zero for that page. This part of the exam is worth 60 points.

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 seven pages including this one in part B of the exam, be sure you have all seven pages

Name: _____

Student number: _____

18 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.

Archegonia

Background extinction

Parsimony

Gametic prezygotic isolation

Ectomycorrhiyzal fungi

Pollen tube

Anything written below this line will not be marked.

29 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.

2.1 Plant Spores are produced inside this structure. sporangium

2.2 The transition from a tadpole to an adult frog. metamorphosis

2.3 A male insect's sperm package. spermatophore

2.4. This type of taxonomy results in on ordered lists of different organisms. ancient

2.5. Some of the first plants didn't have leaves, just cells that form layers without any differentiation into different cells types; the structure was a thallus

2.6 A bird's feather is analogous with these on mammals. skin/fur

2.7 Gemma, in primitive plants like liverworts, are an example of this type of reproduction. splash fertilization

2.8 Sharks have four types of fins that help stabilize the animal as it swims. This is one of the unpaired fins. dorsal

2.9 This term describes the relationship between algae and fungi in lichens. symbiosis

2.10 The main respiratory surface in most amphibians. skin

2.11 These "hairs" help an earthworm anchor itself in its burrow as it digs. setae

2.12 Cladistics uses these characters to unravel the evolutionary relationships between different groups of organisms (must be 1 word!). phylogeny

2.13In non-vascular plants these propel sperm to the egg. water droplets

2.14 In the gymnosperms the spores differ in appearance from each other and the two are described as this. heterospores

2.15 These large tubes help supply air to insect tissues that require oxygen. trachea

2.16 The most anterior pair of fins on the side of a shark are these fins. pectorals

2.17 In arthropods, metameres (segments) combine to form these larger functional body units. tagma

2.18 Birds and insects both fly and have wings, but they don't share a common ancestor so their wings are considered as being this type of character. convergent

2.19 Phylogenetic systematics is also called this. cladistics

2.20 To survive, all amphibians have to lay their eggs in this. _____water_____

2.21 Without any limbs to hold onto captured prey many snakes immobilize their victims using this. _____venom_____

2.22 Like feathers, these help insulate mammals and are a diagnostic character of this vertebrate class. _____hair/fur_____

2.23 The sperm of land plants are produced inside these. _____megaspore_____

2.24 The evolution of fruit improved the dispersal of this part of the flowering plant life cycle. _____seed_____

2.25 Until the fungi came along there was nothing capable of breaking down this reinforcing compounds in plant vascular tissue. _____lignin_____

2.26 The eukaryote organisms are all grouped into this taxon. _____phyla_____

2.27 When the water absorbing and anchoring structures of a plant lack vascular tissue they are referred to as these. _____rhizoids_____

2.28 Plant Spores are produced inside this structure. _____sporangium_____

2.29 The trochophore larva found in annelids is also found in this phylum. _____mollusca_____

Part three of the exam is on the next page

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

6 pts 3.1 Oxygenation of the blood changed between cartilaginous and bony fishes; what were the changes and the resulting advantages of the changes?

Both advantages for bony fishes as cartilaginous used oils

Opercular Gill -bone flap on the body wall
-covers a chamber
-swings in = pumps water in
-swings out = pulls water out, closes mouth cavity
-can respire without moving
-water passes through gill slits

Swim Bladder -bag of gas
-maintain neutral buoyancy
-gills pick up gases and hooked onto the circulatory system
-use capillaries

6 pts 3.2 Changes in carbon dioxide and other green houses gasses have been suggested as the cause of mass extinctions. Where do the gases come from and why do they cause this form of extinction?

Flood Basalts - result of giant volcanic eruption
- coats strecthes of land or ocean floor with basalt lava
- magma flows out
- likely a huge cause of mass extinctions
- massive GHG release
- created mountainous regions

Gas Hydrates - crystalline water-based solids (ice)
- at the bottom of the ocean
- if they move up = ice slowly melts
- temperature increase
- gases get to atmosphere and change atmospheric content
- results in extinction

6 pts 3.3 Nutrient provisioning of the seed differs between Gymnosperms and Angiosperms. How does the origin of the nutrients differ between these two groups?

Angiosperms -double fertilization
- diploid embryo and triploid endosperm
-endosperm = nutrient storage
-absorbed right away or stick around to be abosrbed later

Gymnosperms -haploid female gametophyte
-sporophyte = nutrient storage
- sporophyte = diploid, covering the embryo
-megasporangium > megaspore > egg > ovule

Anything written below this line will not be marked.