Name: _____
Student No:_____

BIO 2135 - Animal Form and Function
Final Examination
Worth 35 % of the final grade

April 14, 2011

a) Place your name and student number in the space provided below. Be sure that your name, or student number, is on the top of each page.

b) Check to be sure that you exam is complete with a total of 20 pages including this one

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

d) Answer the essay question at the end of the exam in the examination booklet that has been provided. Be sure that your name and student number is on the cover of the examination booklet. Double spaced please!

e) The exam is marked out of 170 points

f) This is not an open book exam.

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30pts Part 1. Briefly explain what each of the following biological terms means. Where possible include an example in your explanation from a group or an organism to which the term applies.

Stomochord

Placoid scale

Lateral line

Kingdom Animalia

Aortic arches

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Jugular vein

Dual circulatory system

Hepatic portal

Ommatidium

Hemimetabolus life cycle

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40 pts Part 2: Answer each of the following multiple choice questions by placing and X in the space to the left of the correct choice. There is only one correct answer for each question and questions have either 4 or 5 answers to choose from. **Be sure your X doesn't cross over two answers – if it does the question will be scored as 0.**

2.1 In reptiles, the teeth are uniformly conical and are referred to as
_____ a. apicodont.
_____ b. heterodont.
_____ c. conodont.
_____ d. homodont.
_____ e. thecodont.

2.2 Tubular nerve cord and pharyngeal gill slits are considered to be evidence of evolutionary ties between _____ and chordates.
_____ a. echiurans
_____ b. echinoderms
_____ c. phoronids
_____ d. sipunculans
_____ e. hemichordates

2.3 In the cuticle of terrestrial arthropods all but which of the following is true
_____ a) the chitin and protein in the exocuticle are chemically cross linked to each other
_____ b) waxes in the procuticle waterproof the whole cuticle
_____ c) moulting starts with apolysis
_____ d) the only living layer is the epidermis
_____ e) the endocuticle is recycled and used to build new procuticle

2.4 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
_____ a. gnathostome
_____ c. apod
_____ d. agnatha
_____ e. amniote

2.5 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. holometabolous
_____ c. paurometabolous
_____ d. hemimetabolous
_____ e. chrysalous

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2.6 The tough, leathery polysaccharide in the arthropod procuticle is
_____ a. lipoprotein.
_____ b. calcium carbonate.
_____ c. scleroprotein.
_____ d. chitin.
_____ e. glycogen.

2.7 In birds and reptiles, the excretion of _____, conserves water.
_____ a. urea
_____ b. ammonia
_____ c. creatine
_____ d. creatinine
_____ e. uric acid

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

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

2.10 Pulmonary ventilation in lunged amphibians is accomplished by
_____ a. the diaphragm.
_____ b. the ribs.
_____ c. ram ventilation.
_____ d. a buccal pump.
_____ e. countercurrent exchange.

2.11 A mammal that feeds on the flesh of another animal is called a/an
_____ a. carnivore.
_____ b. herbivore.
_____ c. insectivore.
_____ d. omnivore.
_____ e. frogivore.

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2.12 In their feeding habits, most adult amphibians are
_____ a. herbivores.
_____ b. carnivores.
_____ c. sanguinivores.
_____ d. frugivores.
_____ e. scavengers.

2.13 A common chamber that receives excretory, digestive, and reproductive products is the
_____ a. rectal gland.
_____ b. rectum.
_____ c. colon.
_____ d. pyloric cecum.
_____ e. cloaca.

2.14 The _____ of most birds has a large, medial keel for attachment of flight muscles.
_____ a. synsacrum
_____ b. sternum
_____ c. uncinate
_____ d. scapula
_____ e. humerus

2.15 Which of the following structures are not included in the mouthparts of insects?
_____ a) pedipalps
_____ b) labrum
_____ c) mandibles
_____ d) maxillae
_____ e) hypopharynx

2.16 In the inner ear of fishes, the _____ detects rotational movements.
_____ a. sacculus
_____ b. semicircular canal
_____ c. eustachian tube
_____ d. utriculus
_____ e. lateral canal

2.17 The food of a crayfish is sorted according to size by setae in the:
_____ a. Gastrolith
_____ b. hepatopancreas
_____ c. gastric mill
_____ d. cardiac stomach
_____ e. pyloric stomach

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2.18 The circulatory system of acorn worm sends blood anteriorly into a series of sinuses called the _____, which filters excretory wastes.
_____ a. nephridium
_____ b. flame bulb
_____ c. renette
_____ d. glomerulus
_____ e. renal corpuscle

2.19 Mammals have teeth that are differentiated into a variety of tooth types. This condition is known as
_____ a. Diphyodont
_____ b. Heterodont
_____ c. Monodont
_____ d. Homodont

2.20 Body wall muscles of fishes are arranged in bundles called
_____ a. somites.
_____ b. lamellae.
_____ c. tagmata.
_____ d. myomeres.
_____ e. laterals.

2.21The large pinching claws of a crayfish or lobster occur on appendages called the:
_____ a. chelipeds
_____ b. chelicera
_____ c. uropods
_____ d. Swimmerets
_____ e. Mandibles

2.22 The opening between the right and left atria of a mammalian fetal heart is the
_____ a. ductus venosus.
_____ b. foramen magnum.
_____ c. semilunar valve.
_____ d. ductus arteriosus.
_____ e. foramen ovale.

2.23 Food trapped on the inner surface of the pharyngeal basket of a tunicate is passed to this structure before moving into the digestive system
_____ a. Urostyle
_____ b. Stomochord
_____ c. Endostyle
_____ d. Prosostyle

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2.24 Only in the _____ reptiles is the ventricular septum in the heart complete.
_____ a. crocodilies
_____ b. lizzards
_____ c. dinosaurs
_____ d. turtles

2.25 The cartilagenous fishes belong to the class
_____ a. Gnathostomata.
_____ b. Chondrichthyes.
_____ c. Elasmobranchii.
_____ d. Agnatha.
_____ e. Osteichthyes.

2.26 In some sea stars, the aboral surface contains pincerlike structures called _____, which are used for protection and clearing the surface of debris.
_____ a. pedicellariae
_____ b. chelicerae
_____ c. chelipeds
_____ d. chelae
_____ e. maxiIlipeds

2.27 Birds are capable of flight because they have
_____ a. Wings and a lightweight skeleton
_____ b. Highly efficient respiratory and digestive system
_____ c. A high-pressure circulatory system and well developed nervous and sensory systems
_____ d. All of these.

2.28 The part of the bird feather that emerges from the follicle is known as the
_____ a. Quill
_____ b. Vane
_____ c. Barb
_____ d. Barbule

2.29 The excretory system of insects works by
_____ a. excreting wastes across the digestive system membrane.
_____ b. active transport of just the waste molecules across the tubules.
_____ c. transport of all ions and solutes across the tubule and retrieval of water and useful ions in the rectum.
_____ d. excretion of the wastes through coxal glands

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2.30 Which of the following structures are not included in the mouthparts of insects?
_____ a) pedipalps
_____ b) labrum
_____ c) mandibles
_____ d) maxillae
_____ e) hypopharynx

2.31 Gas exchange across the skin is called
_____ a. ram ventilation.
_____ b. countercurrent exchange.
_____ c. cutaneous respiration.
_____ d. buccopharyngeal exchange.
_____ e. branchial respiration.

2.32 Mammals have all the following types of teeth except:
_____ a. Incisors
_____ b. Molars
_____ c. Dentaries
_____ d. Canines
_____ e. Premolars

2.33 Birds do, but reptiles do not have
_____ a. Scales
_____ b. Bladders
_____ c. Endothermy
_____ d. Internal fertilization

2.34 Sea stars, sea urchins, and sea cucumbers belong to the phylum
_____ a. Echinodermata.
_____ b. Radiata.
_____ c. Deueterostomia.
_____ d. Taroigrada.
_____ e. Phoronida.

2.35 Which of the following is not a role of the water vascular system in echinoderms
_____ a. Gas exchang
_____ b. Excretion
_____ c. Digestion
_____ d. Locomotion
_____ e. Circulation

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2.36 The correct order for layers of the arthropod exoskeleton from outside to inside is
_____ a. endocuticle-epicuticle-exocuticle.
_____ b. endocuticle-exocuticle-epicuticle.
_____ c. exocuticle-endocuticle-epicuticle.
_____ d. epicuticle-exocuticle-endocuticle.
_____ e. exocuticle-epicuticle-endocuticle.

2.37 The major secretory and absorptive structures of the sea star digestive system are the
_____ a. cardiac stomachs.
_____ b. rectal ceca.
_____ c. Polian vesicles.
_____ d. pyloric ceca.
_____ e. pyloric stomachs.

2.38 Which of the following structures are not included in the mouthparts of insects?
_____ a. pedipalps
_____ b. labrum
_____ c. mandibles
_____ d. maxillae
_____ e. hypopharynx

2.39 Unique characteristics of echinoderms include all of the following EXCEPT
_____ a. an endoskeleton of plates or ossicles.
_____ b. marine, freshwater, and terrestrial species.
_____ c. pedicellariae.
_____ d. dermal branchiae.
_____ e. a water-vascular system.

2.40 A portion of the tubule system of their nephrons allows mammals to produce urine that is 2 to 22 times as concentrated as their blood. This part of the tubular system is called the
_____ a. loop of Henle.
_____ b. ureter.
_____ c. urethra.
_____ d. glomerulus.
_____ e. Malpighian loop.

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40 pts Part 3: 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.

3.1 Like terrestrial insects, this part of the epicuticle protects spiders against water loss. _____

3.2 Based on neurological evidence, the atelloceratan head consists of this many segments. _____

3.3 Number of chambers in a bird's heart. _____

3.4 In insects there are no wings attached to this thoracic segment. _____

3.5 An insect's Malpighian tubules empty their contents into this part of the gut. _____

3.6 A reptile's embryo is bathed in this fluid. _____

3.7 The only living part of the arthropod exoskeleton. _____

3.8 The arms of a sea star are connected to this part of the animal (two words). _____

3.9 The number of sets of teeth that diphyodont mammals have. _____

3.10 Sea urchin shells are also called this. _____

3.11 Instead of the lungs expanding and contracting in birds it is these that do that. _____

3.12 Urochordates have these; one is incurrent, the other excurrent. _____

3.13 In this type of insect flight muscle, there is one nerve impulse for each contraction of the muscle.

3.14 The class of vertebrates all have a single opening in the skull to accommodate the jaw muscles. _____

3.15 All chelicerates have this type of feeding strategy and are this. _____

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3.16 A terrestrial insect may swallow this to help escape from the old cuticle. _____

3.17 Modifications of the apocrine glands to nourish the young are one of the possible origins of these glands in mammals. _____

3.18 The anterior tagma of a chelicerate. _____

3.19 Spiders use these to feed rather than mandibles. _____

3.20 Water moves through the gill slits into this space before leaving the lancelet. _____

3.21 Most insects don't see this color in the spectrum. _____

3.22 Digestion of these large polymers in the old cuticle recycles N-acetyl glucosamine and help build the new cuticle. _____

3.23 Not all of a mammal's teeth do the same thing, a condition referred to as this. _____

3.24 Hairs in mammals grows out of this. _____

3.25 The endocuticle and exocuticle combine to form this in arthropods. _____

3.26 This type of mammal carries its young in a pouch. _____

3.27 When present these vesicles act as reservoirs that store water for the water vascular system. _____

3.28 In addition to large eyes, insects also have these eyes. _____

3.29 Spider webs are used to trap these. _____

3.30 Reptiles, birds and mammals are distinguished from fishes and amphibians in that their embryos develop in this fluid filled sac. _____

3.31 You won't find these skeletal elements in an agnathan. _____

3.32 The transition from a tadpole to an adult frog. _____

3.33 The nitrogenous waste of insects (two words). _____

3.34 Most digestion of food for a spider occurs as a result of _____ digestion. _____

3.35 The presence of fore and hind limbs identifies amphibians and all the vertebrates to follow as this group of animals. _____

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3.36 In their evolution, an insect's wings are this type of character.

_____

3.37 The number of pairs of wings found on most insects. _____

3.38 Larval lampreys are found in this type of environment. _____

3.39 In sea stars, gas exchange occurs in the tube feet and these

(Two words). _____

3.40 The water vascular system is also called this type of system.

_____

Part 4 starts on the following page

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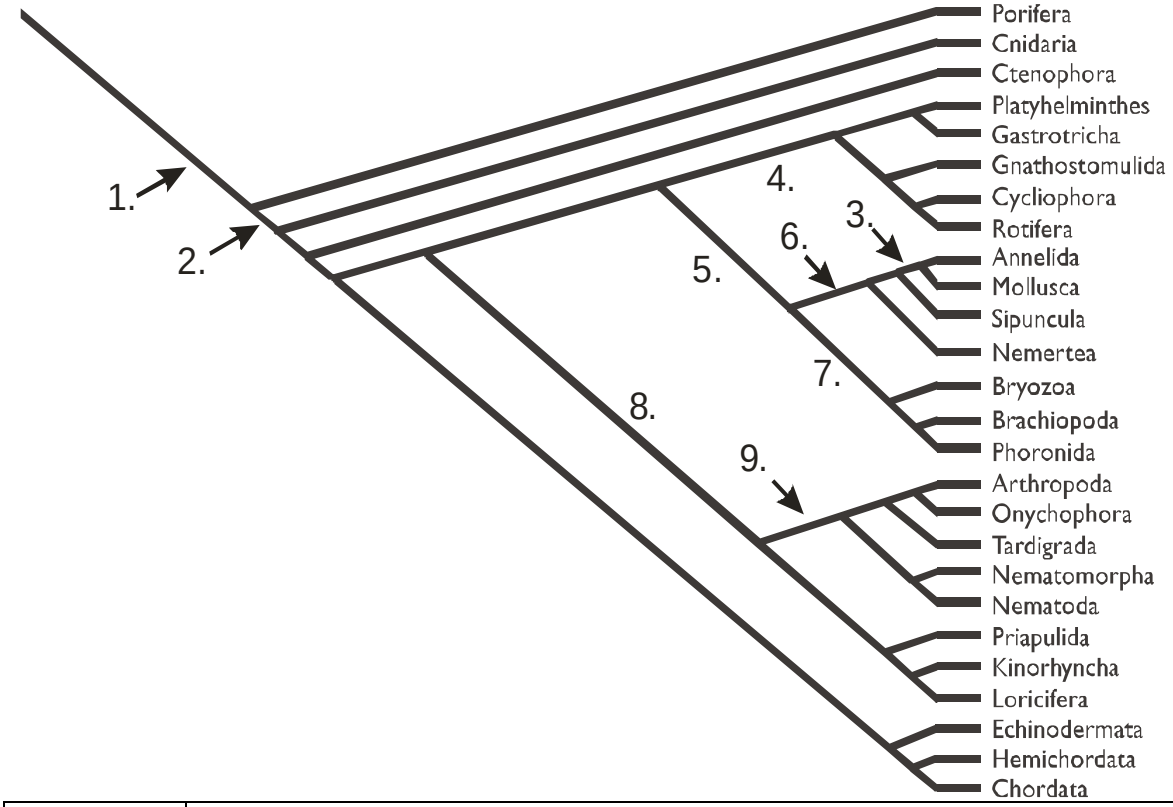
10 pts Part 4 Using the numbers shown on the cladogram describe 5 of the 9 indicated events that defined the evolution of the major animal groups. Be sure to enter the character number in the table.



Character #	Description

Name: _____
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30 pts Part 5: Answer 6 of the following 10 questions in the space provided:

5.1 What is a hydrostatic skeleton? Use two examples to show how it is used for locomotion.

5.2 Compare the circulatory system of a bony fish and a bird.

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5.3 What are the similarities and differences in how the muscles work during insect indirect and direct flight.

5.4 Why is the skin of an amphibian suited for the way these animals live?

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5.5 What are the main parts of the vertebrate digestive system and what are their respective functions

5.6 What is the difference between complete and incomplete metamorphosis in insects? Is there any advantage of one over the other?

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5.7 How does the tube foot work?

5.8 Briefly explain how the insect compound eye forms an image.

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Student No:_____

5. 9 How does a Malpighian tubule work?

5.10 How do sharks and boney fish maintain neutral buoyancy, why is it important?

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20 pts Part 7: Answer the essay question in the examination booklet that has been provided. Please Write double spaced please, its much easier to read (Thanks)!

HINT: You may find it advantageous to organise your thoughts in point form using the first page of your examination booklet

Osmoregulation and excretion are closely related processes in animals and where an animal lives often affects how it can carry out these processes. Using an example organism from each of the three categories compare excretion and osmoregulation processes paying attention to the structures involved and the nature of the metabolic waste that is excreted.

A) An acoelomate organism
B) A terrestrial protostome
C) A marine deuterostome