BIO 2135 - Animal Form and Function
Midterm examination
Worth either 10% or 15% of your final grade

Friday, March 9, 2012

a) Place your name and student number in the space provided below. Be sure that your name is on the top of each page because the exam **will** be separated to facilitate marking

b) Circle the lab section for your lab. This information is used to get the exam back to you

c) Check to be sure that your exam is complete with a total of 14 pages including this one

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

e) The exam is out of 90 pts.

Name:_____

Student No:_____

Circle your lab section:

Tue: A1-BSC312, A5-BSC330.

Wed: A2-BSC312, A6(1)-BSC330 A6(2)-BSC335

Thu: A3-BSC312, A7-BSC330

Fri: A4-BSC312, A8-BSC330

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Name:..... Student Number: .....

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

Cuticle

{nonliving layer}{on the outside of the animal/external covering}{Secreted by an epidermis that lies underneath}{Contains chitin or Collagen in Ecdysozoa}{name a group with cuticle} any three for the three points.

Aciculum

{Inside parapodia/internal structure}{supports the parapodia}{made of chitin} {In marine worms/polchates - just say marine worms if worms is used, worms by itself would include the earthworm that doesn't have them} First two must be in the answer either of the third or fourth can be used for the third point

Veliger larva

{Characteristic/defining/autapomorphie of the Mollusca} {Forms from trochophore larve} {Large ciliated lobes (two)}{Ciliated lobes used in locomotion and feeding} First two must be in the answer and the last two points to bring it to a total of three.

Elastic capsule chromatophores

{Cephalopods/squids/octopous}{produce colours on the surface/camouflage of the animal}{Expand and contract to change intensity of the colour}

Metamerism

{segmentation of the body}{repeated segments}{repeated structures include internal organs and muscles – there must be some indication in the answer that the students realize that is a repition of complex structures. Endoderm/gut is not repeated}

Annelida

{Phylum of Animals – identify the correct taxanomic level} autapomorphies that define the phylum for the remaining points {Mesodermal/muscle metamerically/segmentally arranged} {four bundles of setae – it is not enough to say setae it is the four bundles}

Glochidia

{larval stage}{freshwater}{clams/bivalves}

22 pts Part 2 Answer each of the following multiple choice questions by placing an X in the space to the left of the correct choice. There is only one correct answer for each

2.1 Crustaceans differ from all other living arthropods in having

_____a. chitin in the exoskeleton.

_____b. one pair of antennae.

_____c. only two pairs of walking legs.

_____d. a carapace.

___**X**___e. biramous appendages.

2.2 The only living cephalopods that possess an external shell are the

_____a. scallops.

_____b. octopods.

_____c. chitons.

___**X**___d. nautilids.

_____e. squids.

2.3 The inner layer of the mollusc shell is the layer.

_____a. radular

__X__b. prismatic

__X__c. nacreous

_____d. helix

_____e. periostracum

2.4 This anterior part of the annelid surrounds the mouth

__X__a. peristomium

_____b. prostomium

_____c. pygidium

_____d. first body segment

2.5 The large pinching claws of a crayfish or lobster occur on appendages called the:

__X__a. chelipeds

_____b. chelicera

_____c. uropods

_____d. Swimmerets

_____e. Mandibles

2.6 Insects, centipedes and millipedes together constitute the

_____a. Arthropoda.

_____b. Biramia.

_____c. Mandibulata.

__X__d. Atelocerata.

_____e. Myriapoda.

2.7 The body of molluscs is divided into two main regions called

___**X**____a. head-foot and visceral mass.

_____b. mantle and foot.

_____c. head-foot and enterocoel.

_____d. visceral mass and mantle.

_____e. head and foot.

2.8 The circulatory system of marine worms is

_____a. bloodless.

___**X**____b. closed.

_____c. lacunar.

_____d. open.

_____e. countercurrent.

2.9 Giant axons are utilized in the earthworm for:

_____a. coordinating mating.

___**X**____b. rapid escape movements.

_____c. preventing drowning.

_____d. coordinating digestion.

_____e. improving the visual sensory system.

2.10 The segment of polychaetes, the _____, surrounds the mouth and bears sensory tentacles or cirri.

_____a. pharynx

_____b. head

___**X**____c. peristomium

_____d. notopodium

_____e. neuropodium

2.11 The individual receptors of the compound eyes of an insect are called

____**X**____a. ommatidia.

_____b. ocelli.

_____c. eyespots.

_____d. statocysts.

_____e. photophores.

2.12 You would find ciliated ctenidia in which of the following animals

_____a. marine annelid *Nereis*

_____b. a squid

____**X**____c. a clam

_____d. a spider

_____e. an insect

2.13 The outer layer of the arthropod exoskeleton called the _____ is made of a waxy lipoprotein, which makes it impermeable to water.

_____a. procuticle

_____b. mesocuticle

____**X**____c. epicuticle

_____d. endocuticle

_____e. sclerocuticle

2.14 The main body cavity of a crustacean

_____a. Pseudocoel

_____b. Mesocoel

____**X**____c. Hemocoel

_____d. Pseudocoel

2.15 The thin-walled storage area of the earthworm digestive tract is the

_____a. pharynx.

_____b. stomach.

___**X**___c. crop.

_____d. esophagus.

_____e. gizzard.

2.16 In earthworms, the larval stage is a

_____a. trochophore.

___**X**___b. absent.

_____c. a veliger.

_____d. dormant.

_____e. free-living.

2.17 The radula has a cartilagenous support called the:

_____a. adula sac

_____b. ctenidium

___**X**___c. odontophore

_____d. lamella

_____e. osphradium

2.18 The names Chelicerata and Mandibulata have reference to

___**X**___a. mouthparts.

_____b. genitalia.

_____c. locomotor appendages.

_____d. sensory appendages

_____e. intemal anatomy

2.19 The space between mantle and foot in a mollusc is called the

_____a. hemocoel.

_____b. coelom.

_____c. enterocoel.

____**X**___d. mantle cavity.

_____e. radula cavity.

2.20 Many female crustaceans carry developing eggs attached to their

_____a. pauropods.

_____b. ovigerous legs.

_____c. pereiopods.

____**X**___d. pleopods.

_____e. uropods.

2.21 Nematodes:

_____a. have flame cells.

_____b. have an incomplete gut

_____c. are dioecoius

_____d. have external cilia

2.22 The crayfish antennal gland is involved in this function.

_____a. Digestive

____**X**___b. Excretory/Osmoregulatory

_____c. Sensory/nervous system

_____d. Reproductive

23 pts Part 3: Complete the following sentences using the appropriate terms. Place the term in the space in the sentence or at the end of the sentence.

3.1 The arthropod cuticle consists of this number of major layers. **Three**

3.2 In marine worms, the gonads form on these walls found between each metamere. **Septa/Septal**

3.3 The only living part of the arthropod exoskeleton. **Epidermis**

3.4 The total number of maxillipeds that you would find on a crayfish. **Six**

3.5 This opening is found in the pygidium of an annelid. **Anus**

3.6 The brain of most molluscs resembles this because it surrounds the esophagous. **Ring/Circle**

3.7 The endocuticle and exocuticle combine to form this in arthropods. **Procuticle**

3.8 Digestion of these large polymers in the old cuticle recycles N-acetyl glucosamine and help build the new cuticle. **Chitin**

3.9 The internal organs of a nematode float in the body cavity because it does not have any of these to anchor them in place. **Mesenteries**

3.10 Internal organs in a crustacean are bathed in the blood contained in this body cavity. **Hemocoel**

3.11 The fluid in the nematode pseudocoel is a part of this type of skeleton. **Hydrostatic**

3.12 Earthworms have no gills and instead rely on gas exchange across this. **Skin/Epidermis/body wall**

3.13 Crustaceans dominate this environment. **Marine/aquatic**

3.14 Originally each of the crustacean limbs was involved in gas exchange, locomotion, and this. **Feeding**

3.15 These cells in a nematode are thought to be osmoregulatory. **Rennette**

3.16 The name of the openings in the arthropod heart. **Ostia**

Ostia

3.17 These chitinous rods help support the parapodia of marine worms. **Acicula**

3.18 The molluscs have an open circulatory system and blood pools here. **Haemocoel**

3.19 The number of pairs of seminal vesicles in an earthworm. **3pairs/six**

3.20 Ingested calcareous rocks and stones are dissolved by this type of pH condition in the intestine of an earthworm. **Acidic**

3.21 Clams are an example of the mollusc body plan specialized for this type of feeding. **Filter**

3.22 Snails are referred to as this because both sexual organ systems are found in each animal. **Monoecious/hermaphrodite**

3.23 In leeches, the coelomic cavity has been reduced to spaces referred to as these. **Sunuses**

PART 4 Starts on the next page

Name:..... Student Number: .....

24 pts Part 4: Answer 4 of the following 8 questions in the space provided. Each is worth 6 points. Do an extra question as a bonus and you could raise your marks by up to 6 points depending on how well you answer the bonus.

4.1 Compare the respiratory and circular system of a clam and a squid.

	Clam	Squid
Water movement over the gill surface	Cilia propel water over the surface	Cilia have been lost and contraction of the mantle moves water over the surface
Hearts (number)	One in pericardial cavity	Two branchial hearts and 1 systemic heart
Circulatory system	Open (hamocoel)	Closed
Bloods flow	Anterior and posterior aorta from heart to body.	Branchial heart pushes blood through gills to systemic heart which send it out to the rest of the body using a series of arteries.

Two points for any of the rows in the table to a total of six points

4.2 What are the differences and similarities between a metanephridia and a saccate metanephridia and how they function– give an example of an animal for each.

Must have for one point: Animal example saccate-any arthropod. Metaphridia – any molluscs and Annelids
Similarities: (1 points – any two of these)

- Filter fluid in the body cavity
- Includes a ciliated funnel (nephrostome)
- Tubules and bladder for recovery of essential minerals nutrients

Differences (4 points any two of these pairs)

- Metanephridia filters fluid in the coelom and Saccate metanephridia filter fluid in the haemocoel (2 points for both parts)
- Funnel of metanephridia is open and the funnel of the saccate metanephridia is covered with a membrane
- Animal example saccate-any arthropod. Metaphridia – any molluscs and Annelids

4.3 Compare the crop and its role in the earthworm and leech and marine worm *Neries*.

Leech

- {Predator and food is not always available} so it is {large and stores food/blood}

Earthworm

- {Food is always available} {so crop is very small}

Neries

- {none/has no crop} {predator but there as large amount of prey available so no reason to store food}

4.4 What is a ciliary sorting field? What does it do and give an example of an animal that has one

What and what does it do?

- {Cilia sort particles} of food {depending on their size}
- {Appropriate sized particles go into the digestive gland} for {final digestion}
- Rejected/wring size particles pass to the intestine
- Molluscs including clam squid etc….

4.5 It's not easy for a nematode to swallow food. What's the problem and how does the nematode overcome it?

{Muscles of the body wall constantly contracting} to {give the animal a rigid cuticle}. {Compressed the gut}{no muscles on the gut/the pressure would squeeze contents out} {double valve in pharynx – do not mention anus because the question asks about swallowing}{Front valve open and back closed when filling, front closed and back open when pharynx squeezes food into the intestine}

4.6 The dart is an important part of mating in snails. What is it, what does it do?

{Snails are monecious/hermaphrodite}{In mating each stabs a dart into the other}{changes behavior of the animal} that is {most deeply or if only one of the two is darted} {Cause the darted to be less likely to transfer sperm} {More likely to receive sperm and transfer it to the seminal receptacle.

4.7 Why is only the old endocuticle and not the new procuticle digested during moulting in arthropods ?

{First, digestive enzymes (proteinases and chitanses) secreted in the space in space between epidermis and old cuticle}{are inactive} {Second, a layer of the epicuticle (cuticulin) secreted}{this layer is semipermeable and only lets small things through}{Digestive enzymes can't get through and attack the new procuticle laid down underneath}{Once cuticulin is in place the digestive enzymes are activated- they may mention activating substance small enough to diffuse through but this is not essential}

4.8What are the presumed advantages for torsion in snails?

{Two possible advantages}{one as a larval advantage the other as an adult advantage}
Larval advantage: {cross over, twisting the of muscles between visceral mass and foot}{means head and tip of the foot pulled into the shell before the middle of the foot – otherwise they would be the last in}
Adult advantage: {Moves the mantle cavity to the front of the animal} either of the following two advantageous consequences of moving the mantle forward {Snails detect water quality with sensory structures in the mantle cavity – they are now facing forward and like all animals the snail is detecting where it is going} or {As the snail moves it stirs up the sediments it crawls over and these are pulled in to the mantle cavity and contaminate the surface of the gill}

Students will go to great efforts to work in the disadvantage of dumping fecal waste on the head of the snail – but it's no relevant to the question being asked