

Invertebrate Zoology
Midterm Exam I- Fall 2010

Read through the exam before you begin. **This exam consists of four (4) Parts.** You must provide answers for each Part. However, you are required to **answer only a SUBSET of the questions (terms, etc.) in Parts I-IV.** If you answer more questions than indicated in the instructions provided for each Part, your answers will be graded in order, and you will be graded only on the number of questions you are required to answer. Feel free to use diagrams liberally.

Part I. Describe one similarity and one difference between 5 of the following 8 pairs of terms. In each case, be certain to indicate which feature represents a similarity, and which represents a difference. (4 points each; 20 points total)

1. protonephridium vs. lateral excretory duct

2. eucoelomate vs. blastocoelomate

3. syconoid vs. leuconoid

4. Radiolaria vs. Lobosea

5. radial vs. biradial symmetry

6. gastrodermis vs. endoderm

7. gasterozoid vs. gonozoid

8. mictic vs. amictic ova

Part II. For 8 of the following 12 sets of features identify the Phylum, Subphylum or Class that is BEST characterized by the features provided. (2 points each; 16 points total)

1. toe-bearing blastocoelomates, some of which are sessile, some of which are motile, all of which have a mastax. _____
2. acoelomates with a neodermis that are parasites of vertebrates at some stage in their lives.

3. mostly leuconoid, many with spongin, some with gemmules. _____
4. functionally acoelomate, with ventral cilia and between 400 and 500 species. _____
5. gelatinous, planktonic, with colloblasts. _____
6. unicellular, not rhizarians, unique in their possession of infraciliature. _____
7. radiatans entirely lacking a medusoid stage, some of which are hard and some of which are soft.

8. jawed, functionally acoelomate, with ventral cilia. _____
9. non-eucoelomate animal taxon with greater than 10,000 species. _____
10. primarily marine, with rhynchocoel, some with pilidium larva. _____
11. provide evidence that sponges may be colonial; unicellular; with collar. _____
12. classified with rotifers in the Syndermata, but entirely parasitic. _____

Part III. Answer 7 of the following 12 questions (6 points each; 42 points total)

1. Using labeled cross sections, distinguish between the ectoderm and mesoderm in a blastocoelomate; be certain to also indicate the location of the gut and body cavity (if appropriate).

2. Name and provide a distinguishing characteristic for 3 of the 4 classes of Cnidarians.

a.

b.

c.

3. To date, we have examined over 20 phyla of invertebrates. These taxa exhibit a wide diversity of strategies for osmoregulation and excretion of wastes. Select **three (3)** of the phyla we have covered to date that illustrate this DIVERSITY and describe osmoregulation/excretion in each. Be certain to indicate the phyla you have selected.

a.

b.

c.

4. Select a multicellular phylum of invertebrates and describe how the majority of its members handle each of the functions listed below:

Phylum: _____

a. reproduction

b. digestion

c. locomotion

d. excretion

5. Identify which of the following groups are considered to be monophyletic by circling yes or no as appropriate. In the cases of those you have indicated are monophyletic, provide a potential synapomorphy for the group in the space provided. For those that are not monophyletic, write N/A in the space provided.

- a. Ciliophora monophyletic? yes/no synapomorphy: _____
- b. Nematoda monophyletic? yes/no synapomorphy: _____
- c. Rotifera monophyletic? yes/no synapomorphy: _____
- d. Protists monophyletic? yes/no synapomorphy: _____
- e. Neodermata monophyletic? yes/no synapomorphy: _____
- f. Invertebrates monophyletic? yes/no synapomorphy: _____

6. Dennis is very enamored with invertebrates and would like to bring an interesting specimen to school to **show** his class during show-and-tell. The problem is that, although the teacher will let him pass things around the class, his classroom is not equipped with a microscope. Dennis is considering the following taxa. In each case, indicate whether it would be appropriate for Dennis' purposes by circling yes or no. If you have circled no, indicate why it would not be appropriate in the blank provided; if you have circled yes, indicate something interesting about the taxon that Dennis might mention to his class.

- a. kinorhynch yes/no _____
- b. hexactinellid sponge yes/no _____
- c. entoproct yes/no _____
- d. monogonontan rotifer yes/no _____
- e. priapulid yes/no _____
- f. foraminiferan yes/no _____

7. Describe/provide a definition for each of the following structures:

a. trichocyst

b. blastopore

c. cnida

8. Despite the tiny size of many of the invertebrate phyla covered to date, predation figures prominently in the lives of many. Select **three (3)** phyla of invertebrates that include predatory members and describe how predation is accomplished in these taxa. Be certain to name the phyla you have chosen.

a. Phylum:

b. Phylum:

c. Phylum:

9. List 6 phyla of acoelomate or blastocoelomate metazoans and **rank** them in order from 1 through 6 based on the number of species they are currently thought to include. (Use 1 for the MOST diverse phylum and 6 for the LEAST diverse).

Phylum	Diversity Rank
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

10. Using **labeled** diagrams illustrate the life-cycle of **either** *Aurelia* or *Obelia*.

11. Dennis has acquired a mixed **marine** sample that consists of the following items: some seawater, a Norwegian lobster, some bottom sediment that includes sand and mud scraped from the sea bottom, and a little fish. Identify 1 protist, 1 parazoan, 1 radiatan, 1 acoelomate (at least functionally) and 2 blastocoelomate (at least functionally) **phyla** of invertebrates that might be found among Dennis' samples/substrates. In each case indicate which of Dennis' samples/substrates the phylum you have listed is likely to be found.

a. protist phylum _____ sample/substrate: _____

b. parazoan phylum _____ sample/substrate: _____

c. radiatan phylum _____ sample/substrate: _____

d. acoelomate phylum _____ sample/substrate: _____

e. 1st blastocoelomate phylum _____ sample/substrate: _____

f. 2nd blastocoelomate phylum _____ sample/substrate: _____

12. For each of the following structures/organs identify the embryonic germ layer of origin (i.e., ectoderm, mesoderm, or endoderm).

a. ventral cilia in "turbellarians" _____

b. cells of circulatory system in nemerteans _____

c. unusual muscle cells in nematodes _____

d. germinovitellaria in rotifers _____

e. zonite ganglia in kinorhynchs _____

f. protonephridia in platyhelminthes _____

PART IV. Complete 22 of the 27 blank cells in the following table of invertebrate life cycles and larval types. Note: each row must involve a DIFFERENT larval form. (22 points)

LARVAL STAGE	PHYLUM to which it belongs	Free-swimming (yes/no)	Differs conspicuously from adult sexual stage in form (yes/no) (explain if necessary)	Stage that follows (comes immediately after)
Oncomiracidium			yes	
Planula larva				scyphistoma
Cydippid larva		yes	no	adult
J-2				
	Porifera			adult/colony
	Platyhelminthes		yes	
Pilidium larva				adult
	Priapulida	no	yes	adult
	Cnidaria			
Higgin's larva		no		adult