

Name \_\_\_\_\_

## Final Examination Biology 120

### Instructions:

You will receive

- a. The exam packet including evaluation forms
- b. 3 scantron sheets

### Exam (do the exam first )

1. Please write your name in the upper right of this sheet.
2. Print your name on one of the scantron sheets last name first
3. Fill in the bubbles under your name on this scantron sheet
4. Enter the correct answers to the exam questions on this scantron sheet
5. Be sure to answer question 101 correctly.

### Lecture evaluation

1. Take the second scantron sheet and fill in the word "Biol Brugam" where your name would go. (Do not put your name on the evaluation scantron)
2. Enter the answers to the questions from the green colored sheet on this scantron
3. You may provide any written comments that you wish directly on the green sheet

### Lab evaluation

1. Take the third scantron sheet and fill in the letters "Biol TA" where your name would go. (Do not put your name on the evaluation scantron)
2. Enter the answers to the questions from the lavender colored sheet on the scantron
3. You may provide any written comments that you wish directly on the lavender sheet
4. Be sure to answer question 1 correctly and to circle your answer on the lavender sheet

### Turning in the examination packet

1. Tear the two colored evaluation question sheets off of the exam
2. Place the colored sheets in the envelopes labeled "Green Question Sheet" or "Lavender Question Sheet"
3. Place the evaluation scantrons in the envelopes labeled "lecture scantron" or "TA scantron"
4. Place the exam questions and the exam scantron in the appropriate piles.

## Exam Questions

1. What kind of symmetry do echinoderms have?  
a. Bilateral      **b. Radial**      c. Concentric      d. Backwards and forwards
2. What kind of symmetry did the inferred echinoderm ancestor have?  
**a. Bilateral**      b. Radial      c. Concentric      d. Backwards and forwards
3. The starfish is a problem for oystermen in the Chesapeake because it is a predator on oysters. Some oystermen take any starfish that they catch and cut it up with a knife throwing the parts back into the bay. Are they saving their oysters? Why or why not?  
a. They are saving their oysters because the starfish are all mortally wounded by this activity  
**b. They are not saving their oysters because starfish have strong regenerative powers and each piece becomes a new starfish**  
c. They are saving the oysters because the dirty knives that they use infect the starfish with bacteria  
d. They are not saving the oysters because the juice of the sliced up starfish is toxic to oysters

4. How do we know that echinoderms are deuterostomes?
  - a. They have holoblastic cleavage
  - b. They have radial symmetry
  - c. **Their anus is made from their blastopore**
  - d. Their mouth is made from their blastopore
  
5. Sea urchins are adapted to a particular life style. What is that life style?
  - a. They feed on fish
  - b. **They scrape algae from rocks**
  - c. They filter food from the water
  - d. They kill bivalves for a living.
  
6. In the struggle between a starfish and its bivalve prey, the starfish nearly always wins. Why?
  - a. Starfish muscles are just stronger
  - b. Starfish have an effective venom
  - c. Starfish are faster than clams
  - d. **Starfish have a water vascular system based on hydraulics that does not tire like a clam's adductor muscles**
  
7. Echinoderms have a specialized form of locomotion. What structures do they use to move?
  - a. Siphon - jet propulsion
  - b. Fins - Swimming
  - c. **Tube feet - crawling**
  - d. Cilia - gliding
  
8. The pharyngeal gill slits evolved in early chordates as a \_\_\_\_\_.
  - a. Respiratory organs
  - b. Reproductive organs
  - c. **Filter feeding apparatus**
  - d. Organ of movement
  
9. How do we know that sea squirts are chordates?
  - a. **Their larvae have all of the chordate characteristics**
  - b. Their adults have all of the chordate characteristics
  - c. They have a backbone
  - d. They have paedomorphosis
  
10. All chordates have the following at least some time in their lives:
  - a. Notochord
  - b. Dorsal tubular nerve cord
  - c. Pharyngeal gill slits
  - d. **All of the above**
  
11. In which of the following groups does the notochord persist throughout life?
  - a. Vertebrates
  - b. **Cephalochordates**
  - c. Chondrichthys
  - d. Osteichthys
  - e. Urochordates
  
12. Ostracoderms were the earliest vertebrates in the fossil record. Which of the following did they lack?
  - a. Gill slits
  - b. Dermal bone
  - c. **Jaws**
  - d. Dorsal nerve cord
  
13. Which of the following is a jawless fish alive today
  - a. **Lamprey**
  - b. Shark
  - c. Crossopterygian fish
  - d. Coelacanth
  - e. Tile fish
  
14. What are placoid scales?
  - a. Keratinized scaled that keep the skin dry
  - b. Small plates of dermal bone embedded in the epidermis
  - c. **Small tooth-like structures that are embedded in the epidermis and that contain enamel and dentine**

15. What are the ampullae of Lorenzini?
- Hearing organs in fish
  - Part of the lateral line
  - Electric receptors in sharks**
  - Wine bottles invented by a merchant named Lorenzini
16. Which of the following is a surviving sarcopterygian fish?
- Perch
  - Hagfish
  - Shark
  - Coelacanth**
17. Dr. Jake Schaefer of our department proposed an experiment. He suggested that we tie fishing weights to a goldfish and put him in an aquarium. The weights will hold the goldfish on the bottom of the aquarium. If after a week of this treatment, we take the weights off, what should happen to the fish?
- He should immediately float to the surface and stay there for a couple of hours**
  - He should sink down to the bottom and stay there just as if we had not removed the weights
  - He should swim around the tank with no problem.
  - He will die because his swim bladder will explode
18. The lake trout fishery in the Great Lakes collapsed. Why?
- The trout were affected by a virus
  - The trout were overfished by commercial fishermen
  - The zebra mussel killed them
  - The sea lamprey entered the Great Lake through the Welland Ship canal and killed the trout**
19. Salmon return to spawn in the stream where they were hatched. How do they do it?
- They navigate using an exquisite sense of location
  - They remember underwater landmarks by sight
  - They navigate by the stars
  - They remember the smell of their home stream and seek it out**
20. Which of the groups of fishes seems to be the most recent ancestor of tetrapods?
- Myxini
  - Chondrichthys
  - Actinopterygii
  - Sarcopterygii**
  - Teleostei
21. Respiration by amphibians is by \_\_\_\_\_.
- Skin
  - Lungs
  - Gills
  - All of the above**
22. How many chambers are in an amphibian heart?
- 1
  - 2
  - 3**
  - 4
  - 5
23. The first amniotes and, thus, the first completely terrestrial vertebrates were \_\_\_\_\_.
- Sarcopterygian fishes
  - Amphibians
  - Reptiles**
  - Mammals
  - Birds
24. Which of the following embryonic membranes is/are found in reptiles?
- Amnion
  - Chorion
  - Allantois
  - Yolk sac
  - All of the above**
25. The part of the turtle shell that is on the ventral side is called the:
- Plastron**
  - Plastronium
  - Carapace
  - Ventral plate
26. The reptile scale differs from a fish scale because:
- It has bone
  - It has dentine like a tooth
  - It is made of keratin (a hard protein)**
  - It is detachable

27. When did the dinosaurs go extinct and what is the current theory about what caused their extinction?
- End of the Mesozoic – because of a huge meteor strike
  - End of the Quaternary – because of cooling climate
  - End of the Permian – because of huge volcanic eruptions
  - End of the Mesozoic because they were outcompeted by mammals
28. What does the “pit organ” do in rattlesnakes?
- It is a sense organ for smell
  - It is a sense organ for hearing
  - It is a sense organ for infra-red radiation which allows the snake to track warm-blooded prey
  - It is a sense organ for touch
29. Reptiles are often thought of by the lay-person as “not quite as good” as mammals. After all, ~~mammals~~ reptiles were replaced by mammals when dinosaurs died out. This idea is a misconception. What are reptiles really good at when compared to mammals.
- They are good at living in the arctic
  - They are good at living in places with low energy supplies. Because reptiles are ectotherms they are very energy-efficient vertebrates relative to mammals
  - Reptiles are very good at living in aquatic environments because of their amniotic egg
  - Reptiles have a more efficient method of reproduction than mammals
30. The SIUE zoologist is fishing in Lake Superior. The zoologist catches a beautiful lake trout, but there is another fish hanging off of the trout. The attached fish is eel-like with a slimy, scale-less skin. The fish seems to have a circular, sucker instead of jaws. The sucker is lined with lots of fearsome teeth. The zoologist looks closer to find that the fish has gill slits, but no jaws at all. To what class does the attached fish belong?
- Cephalaspidomorphi
  - Myxini
  - Actinopterygii
  - Sarcopterygii
  - Chondrichthys
31. The sternum in most birds has a keel. This adaptation aids them in \_\_\_\_\_.
- Walking
  - Swimming
  - Wading
  - Digging
  - Flying
32. In mammals which part of the amniotic egg is reduced?
- Chorion
  - Allantois
  - Amnion
  - Yolk
33. Which of the following groups contains egg laying mammals?
- Eutheria
  - Metatheria
  - Monotremes
  - Marsupials
34. The intrepid SIUE zoologist is driving along a road in Edwardsville. The zoologist finds a poor, sad animal that has been killed on the road. The animal is covered with fur. The animal is gray and has a long rat-like tail with scales. Being eager and interested in all kinds of animals, the zoologist goes to the animal and examines it. The zoologist finds that the animal has a fur-lined pouch on its ventral side. In the pouch are about 4 tiny, hairless babies. Each is firmly attached to a nipple. What group does this animal belong in?
- Marsupial mammals
  - Monotreme mammals
  - Placental mammals
  - Birds
  - Reptiles
35. The intrepid zoologist is gardening in a backyard in Edwardsville. (Yes, good zoologists are also interested in plant life!!!) The zoologist moves some leaves and finds a depression in the ground which is lined with fur. The depression contains 5 small animals which are also covered with fur. With them is a larger animal, which is obviously their mother. She is nursing the babies from nipples arranged along her ventral side. To what group does this animal and her babies belong?
- Marsupial mammals
  - Monotreme mammals
  - Placental mammals
  - Birds
  - Reptiles

36. The intrepid SIUE zoologist finds a nest of baby robins that has fallen out of a tree. The babies have few feathers and can barely raise their heads. What is the word that best describes birds who have hatchlings like the baby robins.

- a. Precocial      **b. Altricial**      c. Helpless      d. Vigorous

37. Where does a bird get the "lift" that keeps it in the air?

- a. From flapping its wings  
b. From the twist of its feathers as the wing flapping occurs  
**c. From the shape of the wing.**  
d. From jet propulsion

38. Birds and reptiles have a different excretory product from mammals. What is it?

- a. Urea    b. Ammonia      c. Urine    **d. Uric acid**

39. The main role of glucose in animal cells is to serve as \_\_\_\_\_.

- a. Long-term energy storage  
**b. Energy transfer to cells**  
c. Energy transfer within cells  
d. Structure

40. What are the subunits of proteins?

- a. Amino acids**    b. Sugars      c. Lipids      d. Celluloses

41. Phospholipids are important components of the molecular organization of cells, especially in \_\_\_\_\_.

- a. Cell organelles  
**b. Membranes**  
c. Cytoplasm  
d. in cell division  
e. DNA

42. Active transport requires energy

- a. True**    b. False

43. Will the sons of a colorblind woman be colorblind?

- a. Yes**  
b. No  
c. We can't tell unless we know if the father is colorblind.

44. You have a single nucleotide strand. It has the following base sequence:

A-T-C-G-A

What kind of nucleic acid is it?

- a. RNA  
**b. DNA**  
c. We don't know from the information given

45. The end product of fermentation is \_\_\_\_\_.

- a. Glucose      b. Pyruvic acid    c. Lactic acid    **d. Ethanol**

46. When does cytokinesis occur?

- a. Anaphase      b. Prophase      **c. Telophase**      d. Metaphase

47. Oxidative phosphorylation takes place in what cell organelle?

- a. Mitochondrion**    b. Nucleolus    c. Ribosome      d. Golgi apparatus

48. The diffusion of water through a semi-permeable membrane is called\_\_\_\_\_.
- Active transport
  - Endocytosis
  - Exocytosis
  - Osmosis**
  - Diffusion
49. The form of DNA in a cell is\_\_\_\_\_.
- A triple-linked chain
  - A six-sided hexagon
  - A double helix**
  - A stepladder
50. Polygenic traits are traits, which are controlled by only 1 gene.
- True
  - False**
51. What is the function of sexual reproduction in animals?
- To ensure the fittest survive
  - To prevent excessive variability in offspring
  - To encourage variability in offspring**
  - To cull the weak from the population
52. The environment in which an individual is raised has no effect of the expression of the individual's genotype.
- True
  - False**
53. Chromosomes appear in a cell only during \_\_\_\_\_.
- Meiosis and mitosis**
  - The production of starches
  - The normal day-to-day activities of a cell
  - At night
54. In humans an individual with XY genotype is\_\_\_\_\_.
- Male**
  - Female
  - Don't know from the information given.
55. Speciation that results from the evolution of reproductive barriers between geographically separated populations is known as\_\_\_\_\_.
- Adaptive radiation
  - Allopatric speciation**
  - Hybrid inviability
  - Mutation
56. Hybrids between good species are usually\_\_\_\_\_.
- Extremely healthy
  - Unlike either parent species
  - Perfectly viable, producing lots of offspring.
  - Infertile**
57. Darwin proposed a theory of evolution by the natural selection of individuals whose traits increase their fitness.
- True**
  - False
58. The observation that light-colored versions of the peppered moth (*Biston betularia*) are more abundant when air pollution is low and that dark colored versions of the moth are more abundance in polluted environments represents
- A Cline
  - Polymorphism
  - Non-random mating
  - Natural Selection**
59. A eukaryote:
- has a circular chromosome
  - has a nucleus**
  - is always single celled
  - has no nucleus

60. Where do new alleles come from?
- They are produced at birth from the amnion and the chorion
  - They are produced by mutations**
  - They are produced by failures in the RNA
  - They are produced by errors in DNA copying at mitosis
61. Some animals have real problems because of osmotic changes in their environment. In what environment might animals have the biggest problem in osmoregulation?
- Freshwater
  - The ocean
  - Estuaries, where salt concentrations are constantly changing.**
62. I am looking through a microscope. I see a cell. It has a cellulose cell wall. It also has a nucleus and green-colored organelles in the cytoplasm. What kind of cell is this?
- Plant**
  - Animal
  - Bacterium
  - Fungus
63. What do enzymes do?
- They carry the genetic code
  - They defend the cell against attackers
  - They reduce the activation energy of chemical reactions that are carried out in the cell**
  - They cause cells to move
64. What is the final electron acceptor in an aerobic organism?
- Carbon dioxide
  - Oxygen**
  - Water
  - Ethanol
65. Which of the following processes gets the most ATP from a sugar?
- Glycolysis
  - Oxidative phosphorylation**
  - Fermentation
  - Photosynthesis
  - Anaerobic respiration
66. When a taxonomist is reconstructing the phylogeny of an animal group what characteristics are important?
- Shared ancestral characteristics (pleisiomorphy)
  - Shared derived characteristics (synapomorphy)**
  - Character similarities that misrepresent common descent (homoplasy)
67. What are the 5 kingdoms in the 5 kingdom system?
- Animals, Plants, Algae, Protozoans, Bacteria**
  - Animals, Fungi, Algae, Bacteria, Plants
  - Animals, Plants, Fungi, Protists, Monera
  - Eukaryota, Archea, Bacteria, Animals, Plants
68. When a biologist classifies organism, what branch of biology is he or she following?
- Ichthyology
  - Ornithology
  - Neurology
  - Evolutionary Biology
  - Taxonomy**
69. Who was the first person to classify organism according to their structural similarities?
- Darwin
  - Linneaus**
  - Aristotle
  - Hutton
  - Lyell
70. What is the name of the body cavity in annelids arthropods mollusks, echinoderms, and chordates?
- Eucoelom**
  - Pseudocoelom
  - There is no body cavity in these groups
  - Buccal cavity

71. Which of the following genera has the most complex life cycle?  
 a. *Amoeba*      b. *Paramecium*    c. *Plasmodium*    d. *Euglena*
- 72.. What locomotive organelle is used by the phylum Euglenozoa?  
 a. Pseudopodia    b. Cilia    c. **Flagellae**      d. Muscles
73. What are foraminiferans?  
 a. **Amoeboid protozoans that live in the sea and produce calcium carbonate skeletons**  
 b. . Amoeboid protozoans that live in the sea and produce calcium silicate skeletons  
 c. Amoeboid flagellates that live in the sea  
 d. Marine ciliates
74. The intrepid SIUE zoologist is scuba diving in the Caribbean. The zoologist comes upon a strange structure rising from the sea floor. The structure looks like a cylindrical tube with porous sides with one end rooted in the bottom of the sea. The structure looks like a plant, but it has no chlorophyll. The zoologist releases some fluorescein dye beside the structure. To the zoologist's surprise, the structure draws the dye into itself through the porous wall of the cylinder. After a few seconds, the dye is expelled out the top end of the cylinder. Is this an animal. If so, what is the phylum?  
 a. Yes it is an animal. It is phylum Cnidaria  
 b. **Yes, it is an animal. It is phylum Porifera**  
 d. No, it is not an animal, it is a plant even though it has no chlorophyll  
 d. No, it is not an animal, it is just s weird rock formation
75. Are there sponges in freshwater?  
 a. **Yes**    b. No, all are marine
76. What is a choanocyte?  
 a. It is the name of the little stinging cells that cover all Cnidarians  
 b. Choanocytes are respiratory organs of sponges  
 c. **Choanocytes are the specialized cells that move water through a sponge and that capture food**  
 d. Choanocytes are the specialized cells on the surface of flatworms
77. Which is the most species rich of the following animal groups?  
 a. Sponges  
 b. Primates  
 c. **Insects**  
 d. Crustacea  
 e. Molluscs
78. You (the intrepid SIUE zoologist) are swimming in the sea off of South Carolina. You brush against a jellyfish. You immediately have a burning sensation on your skin where you brushed against the jellyfish. What cells in the jellyfish caused this reaction?  
 a. **The cnidocytes which contain nematocysts that shoot out and inject venom into you**  
 b. The choanocyte which produces an extreme allergic reaction in humans  
 c. The radular dart which shoots out and harpoons you  
 d. The stinger which punctures your skin to inject a neurotoxin
79. The hydrozoans have alternation of generations. What two life-forms do they have?  
 a. Larva and adult  
 b. Sporozoite and merozoite  
 c. Choanozoite and archeozoite  
 d. **Polyp and medusa**
80. How many germ layers do Cnidarians have?  
 a. 1    b. **2**    c. 3    d. 4    e. 5

81. Coral reefs are based on a relationship between organisms. What are they?  
 a. Anemone fish and sea anemones  
 b. Corals and crabs  
 c. Algae and animals  
 d. Corals and endosymbiotic dinoflagellate called zooxanthellae
82. How is a nerve impulse transmitted down a neuron?  
 a. By electrical conduction  
 b. By an electrochemical process called an action potential  
 c. By electrical conduction through the cell membrane  
 d. By waves of sound that pass through the cell
83. What are the reproductive segments of the tapeworm?  
 a. Scolex      b. Proglottid      c. Somite      d. Clitellum
84. What is the platyhelminth parasite that you can get from eating raw fish?  
 a. A tapeworm (*Taenia*)  
 b. *Schistosoma*  
 c. A liver fluke (*Clonorchis*)  
 d. A lung fluke (*Paragonimus*)
85. Birds and dinosaurs could not chew. How do they solve the problem of breaking up their food?  
 a. They have a gizzard full of stones in which they grind their food  
 b. They have especially strong stomach acids  
 c. They regurgitate their food a number of times to allow enzymes to work  
 d. They eat only small pieces of food.
86. Humans can be infected with \_\_\_\_\_ by eating improperly cooked pork.  
 a. *Enterobius vermicularis*      b. *Wucheria bancrofti*  
 c. *Trichinella spiralis*      d. *Ascaris lumbricoides*
87. Pseudocoelomate phyla have a true coelom.  
 a. True    b. False
88. What molluscan class has elaborate eyes with cornea, lens, and retina similar to the eyes of humans?  
 a. Scaphopoda    b. Bivalvia      c. Gastropoda    d. Cephalopoda
89. The shell of a mollusk is secreted by  
 a. the radula      b. the mantle      c. the viscera      d. the foot      e. the style
90. What is a veliger?  
 a. The larva of a freshwater muscle that attaches to fish gills  
 b. The planktonic larva of a marine snail  
 c. The newly settled young of oysters  
 d. The larvae of reef-building corals
91. The number of "hearts" in oligochaetes varies. How many hearts are there in *Lumbricus* ?  
 a. 1    b. 2    c. 3    d. 4    e. 5
92. The segmented body plan and coelom specially fit the annelids for what way of life?  
 a. Mid-water predators  
 b. Sessile filter feeders  
 c. Zooplankton in the ocean  
 d. Infaunal burrowers
93. What is metamerism?  
 a. The reproductive structures of earthworms  
 b. The structures with which earthworms hold on to the sides of their burrows  
 c. The division of an animal's body into many segments  
 d. A structure in the intestine of an earthworm

94. The intrepid SIUE zoologist returns to South Carolina. While sitting on a dock in Charleston harbor (a saltwater estuary), the zoologist decides to have some fun. The zoologist attaches a chicken neck (the uneaten remains of last night's dinner) to a string and dangles it in the water, allowing the chicken neck to lie on the bottom. After about 5 minutes, the zoologist gently pulls up the string and finds an animal attached to the chicken neck. The animal has a hard exoskeleton and jointed appendages. It has 2 pairs of antennae and mandibles. It holds on to the chicken with pinchers. What is the subphylum of the animal?

- a. Chelicerata    **b. Crustacea**    c. Uniramia    d. Polychaeta

95. What are the stages of holometabolous development in insects?

- a. **egg, larva, pupa, adult**  
b. egg, nymph, adult  
c. Egg, tadpole, adult  
d. Egg, nauplius, copepodite, adult  
e. Egg, trochophore, veliger, adult

96. Arthropods have strong exoskeletons. How do they grow in size when they are covered with a hard shell?

- a. The exoskeleton stretches  
b. More material is added to the exoskeleton because it is alive  
**c. The exoskeleton is molted and a new, bigger one is produced**

97. Missing from original exam. Two points awarded to all students for this question.

98. One of the major characteristics of insects is \_\_\_\_\_.

- a. Three pairs of legs on the thorax  
**b. Four pairs of legs on the thorax**  
c. Wings on the abdomen  
d. Chelicerate mouth parts

99. What is gastrulation? (i.e. gastrula formation)

- a. Cells in an embryo arrange themselves around an open space called a blastocoel  
**b. The embryo invaginates to produce the archenteron**  
c. Mesoderm cells pinch off from the archenteron  
d. The anus is formed and the opposite end of the archenteron from the blastopore

100. What are pheromones?

- a. Chemicals used to communicate between animals. They are especially common in insects**  
b. Chemicals used to control processes within the animal body  
c. Chemicals which control reproduction in animals  
d. Pheromone is just another name for hormone

101. How many plus signs are in the lower left hand corner of this page?

- a. 1**    b. 2    c. 3    d. 4    e. 5

**Have a good summer and come back in fall eager to learn more biology!**