

EXAMINATION #2 (PART 1)

Name _____ Date _____

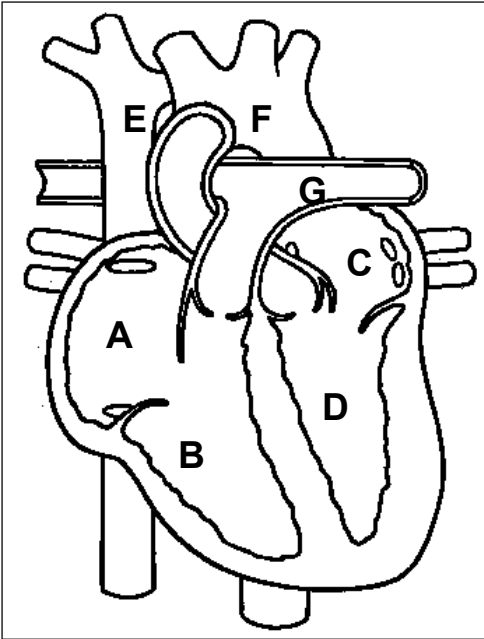
MULTIPLE CHOICE.—For the following multiple choice questions circle the letter in front of the response that best answers the question or completes the sentence. (20%, 2% each)

- Which of the following is derived from **ectoderm**?
 - kidneys
 - liver
 - nerves
 - pancreas
 - None of the above.
- Which of the following is derived from **mesoderm**?
 - brain
 - epidermis
 - melanocytes (pigment cells)
 - proctodeum
 - None of the above
- Which of the following is primarily derived from **endoderm**?
 - dermis
 - kidneys
 - lungs
 - vertebrae
 - None of the above
- Which of the following embryonic **aortic arches** forms “the aorta” in birds?
 - III
 - left IV
 - right IV
 - left V
 - right V
 - None of the above
- Which of the following embryonic vessels forms the **posterior/inferior vena cava** in Tetrapods?
 - left hepatic vein
 - right hepatic vein
 - left posterior cardinal vein
 - right posterior cardinal vein
 - None of the above
- The book *Mutants* describes certain birth defects associated with early development such as siromelia, cyclopia, and double faces. Clearly vertebrates can produce these diverse anatomies. Why don't we see these morphologies as the norm in some living vertebrate groups?
 - Because they only occur in humans.
 - Because they only can be produced in the laboratory.
 - Because they're purely environmental and not genetic.
 - Because they're usually fatal or dysfunctional.
- Which of the following has a **single** completely **un**-divided ventricle and two completely separated left and right atria?
 - Aves
 - Chondrichthys
 - Dipnoi
 - Lepidosauria
 - Lissamphibia
- Which of the following produces and secretes nitrogenous waste as **uric acid**?
 - bass (a ray-finned fish)
 - human (you)
 - iguana (a lizard)
 - salamander
 - shark
- Lymph is basically...
 - blood in the liver.
 - blood in the tissues.
 - plasma in the liver.
 - plasma in the tissues.
 - None of the above.
- Which of the following was the subject of **Brian Couch's Thesis Talk**?
 - Mitochondria in zebrafish, *D. rerio*.
 - Developmental signaling molecules in mice, *M. musculus*.
 - RNA splicing proteins in the worm *C. elegans*.
 - Transcription factors in yeast.



FILL-IN-THE-BLANK/LABEL.—For the following exercises write the appropriate word or words in the available space. (10%)

Use the frontal section (ventral view) diagram below to fill in the indicated structures to the right.



1. Label the indicated chambers and vessels in the diagram at left. (7%)

- A _____
- B _____
- C _____
- D _____
- E _____
- F _____
- G _____

2. For each indicated vessel indicate the embryonic vessel from which each developed. (3%)

- E _____
- F _____
- G _____

DEFINITIONS.—For the following words or phrases define them as accurately and concisely as possible. (20%, 4% each)

1. Cloaca:

2. Dorsal mesentery:

3. Epithelium:

4. Mesothelium:

5. Monophyletic Group:

EXAMINATION #2 (PART 2)

Name _____ Date _____

SHORT ANSWER.—Address each question in as concise and lucid a manner as possible. Do NOT exceed the space provided.

1. Explain how the **endoderm** develops during organogenesis in an organism such as a human. What *anatomical structures* does it form and from what do they form. Hint: I'm particularly looking for discussion of where "buds" form and what they become. (Feel free, but do not feel obliged, to use a labeled sketch for your answer.) (12%)

2. Explain the flow of air through an **avian** lung. Be certain to mention (or label) the important structures and differentiate what happens during inhalation from what happens during exhalation. (Feel free, but do not feel obliged, to use labeled sketches for your answer.) (10%)

3. Compare and contrast the **kidney types, urinary ducts, and genital ducts** of a human, a shark, and a lamprey. This question is asking about BOTH the urinary system and the duct system associated with the gonads. (Feel free, but do not feel obliged, to use a table and/or labeled sketches for your answer.) (18%)

4. Explain basic human **genital development** by describing the **indifferent stage of human genitalia** and then indicating what each indifferent structure forms in a differentiated human male or female. (Feel free, but do not feel obliged, to use a table and/or labeled sketches for your answer.) (10%)