**Second Exam  Vertebrate Embryology   Mar 2, 2018  Your Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1) Another name for the **pronephric duct** is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) During embryonic development, the **pronephric duct transports urine from \_\_\_\_\_\_\_\_\_\_\_\_**

**to the cloaca**.

3) In mammals the **cloac**a becomes **subdivided** into the **rectum and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**?

4) What **transient embryonic structures** control the locations of sensory nerve ganglia?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) These **same transient embryonic structures** subdivide themselves into what four parts?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6) The **lens placode** develops as a **thickening in what subdivision of which of the three germ layers?**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7) The **semicircular canals** of the inner ear **develop from what**?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?

8) In embryonic birds and reptiles, the **diameter of the neural tube is [narrower/broader] than the diameter of its notochord**?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) The inner, bone-like **dentine of teeth is produced by** cells from which subdivision of which germ layer?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10)  The **angular change in direction, per distance along a line or a solid surface** is called the \_\_\_\_\_\_\_\_\_\_\_.

11) Change in Pressure is equal to **tension** in a flexible surface **multiplied times what other second order tensor variable**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12) The **eustachian tube develops from what** embryonic structure? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

13) A pediatrician in Florida used what he had learned in an Embryology course to figure out **why a certain birth defect resulted in a combination of weak immune systems and not enough parathyroid hormone**.  Previously, scientists had guessed that the explanation was that calcium somehow controlled immunity.  What different theory was figured out by this pediatrician?

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14)  Why don't birds sometimes have the birth defect called cleft palates?

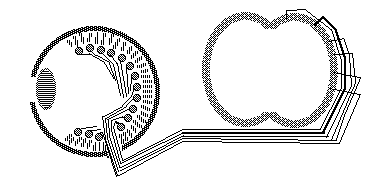
15)  What combination of two symmetries does a snail shell have?

16) Suppose there are **two diffusible transcription factors,** named Wxy and Tuv; and that Wyx stimulates synthesis of both, while both are destroyed at a rate proportional to the local concentration of Tuv.  Then **what additional property would Wxy and Tuv need to have in order for them to be able to create wave-like patterns** of increasing and decreasing concentrations?

17) **Label the parts in the cross section below**, including what organ or tissues each part will develop into.



18) The diagram below summarizes **what embryological phenomenon**?   Please label the parts.



19) Name the symmetry of every capital (uppercase) letter of the alphabet, in groups of symmetry type. For example, the letter **A** has one plane of reflection symmetry.  List the other letters that have this symmetry. Which letters have two planes of reflection symmetry? Continue with all the other possible symmetries until you have accounted for every letter.

20)  **Which of the following develop from previously adjacent epithelial cell sheets**?

  a) The neural retina and the pigmented retina of the eye?

  b) The neural crest and the neural tube?

  c) The enamel secreting cells of your teeth and the skin covering your gums?

  d) The alveoli of your lungs and the cells lining your throat?

  e) The lens of your eyes and the cornea covering your lens?

  f) All of the above?

*On my honor, I have neither given nor received any unauthorized help. (sign)*