

DO NOT USE ANY OTHER PAPER AT ANY TIME WITHOUT INSTRUCTOR PERMISSION

Part I. [24 pts] Choose 3 - omit two. Be brief, focused, and complete. A drawing may help *illustrate* a point, but a drawing by itself is NOT an explanation - **be sure to state what you are trying to illustrate!** *8pts each*

1. Indicate the germ layer(s) which give rise to each of the following (use the key)

- | | |
|--|--------------------------|
| _____ neck | a. ectoderm |
| _____ kidney | b. mesoderm |
| _____ epithelia | c. endoderm |
| _____ spinal cord | d. ectoderm and mesoderm |
| _____ connective tissues | e. mesoderm and endoderm |
| _____ intestine | f. ectoderm and endoderm |
| _____ epithelial lining of the esophagus and trachea | g. all 3 germ layers |
| _____ bone | |

For your choices of # 2, 3, and/or 4, use the blank page provided

2. Draw a "typical" cell, including 8 distinctive structures. For each labeled structure, briefly indicate its main function.
3. Name and describe the structure and function of the five types of intercellular junctions. Sketches may be used but are not required. Be sure that the explanations clearly distinguish each junction from each other one.
4. a. Briefly define, describe (a sketch might help), and contrast endocytosis, phagocytosis, pinocytosis, exocytosis. Be sure to show how they are related to each other, and how they differ - what distinguishes them. Give an example of when or why each might be used.
b. Compare and contrast simple diffusion, facilitated diffusion, and active transport: what do they have in common, how do they differ (some of this is easiest to compare in pairs, rather than all 3 at once).
5. Describe & sketch (the sketch should help, but is not sufficient) and give TWO specific examples of each bone shape category. Be sure that you point out the **important distinguishing** characteristics of each category.

long cuboidal flat

irregular odd

Part II. [18 points]: Draw (sketch) a cross section of skin. Indicate the three layers of skin, with any of their significant "regions" also indicated, **including the layers** of the epithelium (with sufficient detail to be identified); **be sure that the basement membrane is also clearly indicated and labeled & complete.** Also include in your diagram **6 more structures from the following list of (12) structures.** For each structure you draw (both the ones specified above, and the ones you choose), identify it, and **briefly describe its function - so choose structures for which you can give a complete answer!** *use the blank back page*

- | | | |
|---|---------------------------------------|-----------------------|
| 1 - 3 different types of connective tissue | blood vessels (where are they found?) | a muscle |
| up to 3 distinctive nerves (or nervous tissue) structures | hair & its associated structures | 1 or 2 types of gland |
| | melanocytes (in the right place!) | |

Part III. [34 pts]: Choose the one BEST answer. Circle its letter, write it in the blank, or fill in the blank, as indicated. Read each question and **all the choices** carefully because more than one answer might seem correct at first glance. For the non-standard questions, **read instructions carefully!** *1 pt each*

1. Red marrow is
 - a. where red blood cells develop
 - b. where white blood cells develop
 - c. where bone cells develop
 - d. a and b
 - e. all of the above
2. Proteins synthesized on free ribosomes are (usually)
 - a. incorporated into the plasma membrane
 - b. secreted
 - c. incorporated into lysosomes
 - d. used within the cell in cytoplasm or the nucleus
 - e. enclosed in a vesicle
3. The identity of an epithelium is determined by
 - a. number of layers of cells from basement membrane to free border
 - b. shape of apical cells
 - c. shape of basal cells
 - d. average shape of cells
 - e. a and b
 - f. a and c
 - g. a and d
4. The primary germ layer(s) from which all connective tissue forms is/are
 - a. endoderm
 - b. mesoderm
 - c. ectoderm
 - d. a and b
 - e. all of the above
5. A(n) _____ section divides an organ into top and bottom portions
 - a. sagittal
 - b. lambdoidal
 - c. oblique
 - d. coronal
 - e. transverse
6. Which came first?
 - a. morula
 - b. blastocyst
 - c. zygote
 - d. trophoblast
 - e. the chicken
7. Skin
 - a. regulates body temperature
 - b. excretes, secretes, and absorbs substances
 - c. protects body from external environment
 - d. a and b
 - e. all of the above
8. Dense irregular connective tissue that forms a supporting layer around the cartilage is
 - a. perichondrium
 - b. capsule
 - c. periosteum
 - d. epidermis
 - e. dermis
9. The epithelium whose appearance varies, depending on whether the tissue is stretched or relaxed, and in which some cells may be binucleated is
 - a. simple cuboidal epithelium
 - b. nonkeratinized stratified squamous epithelium
 - c. stratified squamous epithelium
 - d. pseudostratified columnar epithelium
 - e. transitional epithelium
10. Microvilli are most likely to be found in

- a. simple cuboidal epithelium
 - b. simple squamous epithelium
 - c. simple columnar epithelium
 - d. transitional epithelium
 - e. all of the above are equally likely
11. The lung is in the
- a. pleural cavity
 - b. thoracic cavity
 - c. pericardial cavity
 - d. a and b
 - e. all of the above
12. A floating rib
- a. is broken
 - b. does not articulate with the sternum
 - c. does not articulate with any vertebra
 - d. articulates between two vertebrae, at demi-facets
 - e. articulates with the sternum only via the costal cartilage shared with another rib
13. Considering cell junctions,
- a. a zonula occludens encircles a cell
 - b. a zonula adherens is impermeable
 - c. a desmosome is a weak junction
 - d. a gap junction is formed by plasma membrane fusion
 - e. all epithelial cells have all five types of cell junction
14. A basement membrane is a(n)
- a. serous membrane
 - b. extracellular matrix
 - c. plasma membrane
 - d. tissue
 - e. mucous membrane
15. All of the following articulate with the maxilla except the:
- a. nasal bone
 - b. frontal bone
 - c. palatine bone
 - d. mandible
 - e. zygomatic bone
16. Anatomical position is characterized by all of the following EXCEPT the
- a. palms facing anterior
 - b. thumbs pointing laterally
 - c. feet are parallel
 - d. body is lying supinated (on its back)
 - e. all of these are true for anatomical position
17. The unicellular gland that secretes mucus in the respiratory tract is a
- a. goblet cell
 - b. simple tubular gland
 - c. simple acinar gland
 - d. endocrine gland
 - e. merocrine gland
18. All of the following are characteristic of epithelial tissue EXCEPT
- a. polarity
 - b. vascularity
 - c. cellularity
 - d. innervation
 - e. high regeneration capacity
19. During the birthing process, cranial bones can overlap at _____ to help the baby fit through the pelvic opening
- a. foramen magnum
 - b. sutures
 - c. cranial fossae
 - d. cranial fissures
 - e. fontanelles
20. For a substance outside the body to be considered inside the body, it must cross

- a. a basement membrane
 - b. an epithelial tissue
 - c. the digestive system
 - d. a and b
 - e. all of the above
21. The spinal nerves exit through the
- a. spinal foramina
 - b. intervertebral foramina
 - c. transverse foramina
 - d. nervous foramina
 - e. foramen magnum
22. Flat bones provide protection for organs and structures within the
- a. abdomen and appendages
 - b. thorax and skull
 - c. spinal cavity and cranial cavity
 - d. abominopelvic cavity and spinal cavity
 - e. thorax and vertebrae
23. Ground substance
- a. is the non-fibrous part of the extracellular matrix
 - b. has a distinctive shape and texture
 - c. is primarily made of one material
 - d. a and b
 - e. all of the above
24. _____ ossification begins with a hyaline cartilage model
- a. endochondral
 - b. intramembranous
 - c. appositional
 - d. interstitial
 - e. fetal
25. Red marrow is found in
- a. all spongy bone
 - b. epiphyses
 - c. small or young diaphyses
 - d. a and b
 - e. all of the above
26. The medial malleolus is part of the
- a. metacarpal IV
 - b. triquetrum
 - c. head
 - d. tibia
 - e. sternum
27. A false rib
- a. is broken
 - b. does not articulate with the sternum
 - c. does not articulate with any vertebra
 - d. articulates between two vertebrae, at demi-facets
 - e. articulates with the sternum only via the costal cartilage shared with another rib
28. Cells that can be found in lacunae include
- a. osteocytes
 - b. chondrocytes
 - c. chondroblasts
 - d. a and b
 - e. all of the above
29. The difference between endocrine glands and exocrine glands is that
- a. exocrine glands secrete products directly into the bloodstream
 - b. endocrine glands are ductless
 - c. exocrine glands are ductless
 - d. a and b
 - e. all of the above
30. The clavicle articulates with the scapula at the
- a. acromial end

- b. sternal end
- c. coracoid process
- d. spine
- e. costal tuberosity

31. Glands that secrete disintegrating cells and their contents, released when the top portion of the cell explodes are

- a. holocrine glands
- b. apocrine glands
- c. merocrine glands
- d. a and b
- e. none of the above - cells don't ordinarily explode on purpose

32. All epithelia must have

- a. a basement membrane
- b. a basal side
- c. an apical side
- d. a and b
- e. all of the above

33. Osteogenic cells include

- a. osteoprogenitor cells
- b. osteoblasts
- c. osteoclasts
- d. a and b
- e. all of the above

34. I (now) know that

- a. dissection begins at the next class, 9/23/2011
- b. I must come prepared with tools, protection, and appropriate manuals and/or atlases
- c. due to the state-wide budget problems, volunteers (to be dissected) are needed since we can not afford cats

- d. a and b
- e. all of the above

Part IV. [8 pts] Match the term with its meaning. Not all meanings will be used.

- | | |
|----------------|--|
| _____ process | a. border facing a free surface |
| _____ apical | b. hole (in a bone, for example) |
| _____ -cyte | c. cell |
| _____ fossa | d. wall |
| _____ foramen | e. center region of hollow structure (tube or enclosure) |
| _____ lumen | f. crack |
| _____ spine | g. any boundary |
| _____ membrane | h. border facing into the body, e.g. connective tissue |
| | k. depression |
| | m. pointy extension |
| | p. sheet-like covering or boundary |
| | s. canal |
| | t. extension; structure that sticks out |

BONUS: WRITE A QUESTION THAT YOU STUDIED FOR, AND FORGETFUL ME, I NEGLECTED TO ASK. ANSWER YOUR QUESTION. PLEASE ASK YOURSELF SOMETHING YOU CAN ANSWER WELL! PLEASE ANSWER THE QUESTION YOU ACTUALLY ASK. [UP TO 5 POINTS AWARDED BASED ON QUESTION & ANSWER] YOU MAY ANSWER ONE ADDITIONAL QUESTION IN PART II *INSTEAD*.

Part IV: [16 pts]. Fill in the following chart. Fill in each column as follows.

A. is this tissue mostly cellular (**C**) or mostly extra-cellular matrix (**ECM**)? [$\frac{1}{2}$ point each]

B. if you were sent to find some, where would you look? Give *one* location for a good sample. [$\frac{1}{2}$ point each]

C. sketch the **tissue** - be sure to include the **distinguishing** characteristics [1 point each]

<u>C or ECM</u>	<u>location example</u>	<u>sketch</u>
_____ simple cuboidal epithelium	_____	
_____ non-keratinized stratified squamous epithelium	_____	
_____ areolar connective tissue	_____	
_____ ciliated pseudostratified epithelium	_____	
_____ adipose tissue	_____	
_____ simple squamous epithelium	_____	
_____ transitional epithelium	_____	
_____ dense regular fibrous collagenous connective tissue	_____	