Multiple choice: select the single most correct answer to each question and mark the letter corresponding to that answer on the SCANMARK card provided. (2 points each)

1. The normal pathway that a new protein will follow as it is made and secreted is: (Note: ER = endoplasmic reticulum)
   A) Smooth ER - Rough ER - Golgi Apparatus - Vesicle
   B) Smooth ER - Vesicle (Rough ER and Golgi not involved)
   C) Golgi Apparatus - Smooth ER - Rough ER - Vesicle
   D) Golgi Apparatus - Vesicle (ER is not involved)
   E) Rough ER - Smooth ER - Golgi Apparatus - Vesicle

2. Acne is a disorder involving the:
   A) unicellular glands  B) sebaceous glands  C) sweat glands
   D) hair follicles  E) apocrine glands

3. The main function of melanocytes is to:
   A) produce vitamin D.
   B) help us find a date.
   C) protect deeper cells from sunlight.
   D) remove dead cells by phagocytosis.
   E) help control body temperature.

4. In order to be "responsive" to the environment, our body must be able to sense changes around it and ____.
   A) reproduce  B) circulate body fluids
   C) breathe  D) assimilate nutrients
   E) react to them

5. The nerve fibers scattered throughout the dermis are associated with (connecting to) ____.
   A) muscles  B) glands  C) sensory receptors
   D) All of the above.  E) None of the above.

6. Which of the following elements is NOT among the 4 most abundant in the body?
   A) oxygen  B) carbon  C) sodium  D) hydrogen  E) nitrogen

7. The nucleus:
   A) forms the microtubules for the cytoskeleton.
   B) packages food for digestion.
   C) is filled with damaged organelles.
   D) is the site of phospholipid synthesis.
   E) is filled with DNA to store genetic information.

8. An osteocyte is a:
   A) bone destroying cell.
   B) bone building cell.
   C) bone cell surrounded by matrix.
   D) bone marrow cell.
9. The ability of our body to change absorbed nutrients into specific molecules which are useful to our body is called ____.
   A) digestion   B) excretion   C) circulation
   D) assimilation   E) absorption

10. Enzymes and the cell's cytoskeleton are examples of ____.
    A) carbohydrates   B) proteins   C) triglycerides
    D) steroids   E) nucleotides

11. Glycogen is a(n):
    A) polysaccharide   B) phospholipid   C) protein
    D) monosaccharide   E) disaccharide

12. The cell membrane is formed from a "bilayer" of ____.
    A) amino acids   B) steroids   C) nucleic acids
    D) phospholipids   E) triglycerides

13. The process by which water naturally moves from one side of a membrane across to the other side is called ____.
    A) diffusion   B) osmosis
    C) active transport   D) phagocytosis
    E) facilitated diffusion

14. ____ muscle tissue can be consciously controlled.
    A) Visceral   B) Skeletal   C) Cardiac
    D) Smooth   E) None of the above.

15. The cells that produce the shaft of a hair are ___ cells.
    A) adipose tissue   B) epithelial
    C) mast cells   D) loose connective tissue
    E) fibrous connective tissue

Use the following equation to answer the questions below.

\[ \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3 \rightarrow \text{H}^+ + \text{HCO}_3^- \]

16. In the equation (above) the molecule \text{H}_2\text{CO}_3 is a(n)
    A) base   B) protein   C) carbohydrate
    D) acid   E) ion

17. In the equation, which of the following molecules is organic?
    A) \text{CO}_2   B) \text{H}^+   C) \text{HCO}_3^-
    D) \text{H}_2\text{O}   E) None of the above.

18. Which of the following is an example of a trace element?
    A) Sodium   B) Nitrogen   C) Iron   D) Sulfur   E) Calcium

19. During **accelerated glycolysis**, glucose is changed to ____ as an end-product.
    A) glycogen   B) carbon dioxide   C) water
    D) lactic acid   E) pyruvic acid
20. Epithelial tissues can perform all of the following functions EXCEPT:
   A) contraction. 
   B) protection. 
   C) secretion. 
   D) absorption. 
   E) Both (A) and (B) are correct.

21. To say that your body is able to maintain homeostasis is to say,
   A) if the body loses something like water, the body will replace it.
   B) your body will be the same today as it was yesterday.
   C) nothing changes in your body.
   D) your body maintains its temperature perfectly, never letting the
      temperature vary even a little bit.

22. Proteins which are going to be used in the cytoplasm (and NOT
    secreted) are made in the ____.
   A) smooth endoplasmic reticulum 
   B) cytoplasm 
   C) nucleus 
   D) rough endoplasmic reticulum 
   E) lysosomes

23. The intervertebral disks that separate the individual parts of the
    backbone are composed of ____.
   A) articular cartilage 
   B) fibrocartilage 
   C) hyaline cartilage 
   D) elastic cartilage

24. Which of the following processes require(s) protein channels in
    the cell membrane?
   A) diffusion and facilitated diffusion only
   B) facilitated diffusion only
   C) active transport and facilitated diffusion only
   D) active transport only
   E) diffusion only

25. Nucleotides are constructed from a five-carbon sugar, an organic
    base, and a(an) ____.
   A) steroid 
   B) two-carbon sugar 
   C) water molecule 
   D) phosphate group 
   E) amino acid

26. The subcutaneous layer is located:
   A) beneath the dermis.
   B) between the epidermis and dermis.
   C) within the dermis.
   D) above the epidermis.
   E) within the epidermis.

27. Bone cells are arranged in concentric circles around central,
    longitudinal tubes called ____.
   A) osteons 
   B) Haversian canals 
   C) osteoclasts 
   D) lacunae 
   E) canaliculi

28. ____ bonds are those which form when two atoms share one or more
    electrons.
   A) very weak 
   B) nonpolar 
   C) ionic 
   D) James 
   E) covalent
29. In the organization of your body, you could say that organs are created by combining _____. (the next lower level of organization)
   A) organ systems     B) tissues     C) organelles
   D) cells     E) muscles

30. Bone that develops between sheetlike layers of connective tissue is called ____ bone.
   A) endochondral     B) osteoclastic
   C) intramembranous (membrane)     D) cartilaginous
   E) soft

31. Anabolic metabolism includes
   A) changes of larger molecules into smaller ones.
   B) constructive processes by which substances are synthesized.
   C) all processes needed to maintain life.
   D) the breakdown of glucose into two pyruvic acids
   E) destructive processes by which substances are decomposed.

32. Which of the following terms includes all the others?
   A) excretion     B) digestion     C) metabolism
   D) reproduction     E) respiration

33. Cartilage tissues are likely to be slow in healing following an injury because
   A) the intercellular material is semisolid.
   B) cartilage cells are surrounded by fluids.
   C) cartilage tissues lack direct blood supplies.
   D) even normal healthy cartilage contains no living cells.
   E) cartilage cells cannot reproduce.

34. Which of the following substances increases in amount during cellular energy metabolism?
   A) glycogen     B) oxygen     C) oxygen and ATP
   D) ATP     E) glucose

35. Eccrine sweat glands:
   A) usually are associated with hair follicles.
   B) are most common in the armpits and groin.
   C) respond primarily to elevated body temperature.
   D) respond primarily to emotional stress.

36. A coxal bone includes the:
   A) pubis     B) ilium
   C) ischium     D) All of the above.
   E) Only (A) and (B).
37. ________________ The process by which a normal body cell divides to form two identical cells is called ____.

38. ________________ Name the molecule that our body uses as its "energy currency" when the body needs energy to do something.

39. ________________ A(n) ____ is defined as a molecule that ionizes in water.

40. ________________ ____ is the process of blood cell formation.

41. ________________ The tough, fibrous membrane that surrounds a long bone is called the ____.

42. ________________ Name one bone in the leg of a human.

43. ________________ Glands that release a very watery liquid without releasing any cellular fragments secrete in a ____ fashion.

44. ________________ The arrector pill muscle is composed of ____ muscle tissue. (what type of muscle tissue?)

45. ________________ If a solution outside of a cell contains a greater concentration of dissolved particles than the contents of the cell, the outside solution is said to be ____.

46. ________________ What is the ratio of carbon:hydrogen:oxygen in a carbohydrate?

47. ________________ As epidermal cells are pushed toward the surface, strands of a protein called ____ develop in their cytoplasm.

48. ________________ The midpoint of the pH scale is ____. (what is the #?)

49. ________________ The parts of an atom that lack an electrical charge are called ____.

50. ________________ A membrane that allows some substances to pass through while excluding others would be called ____.

51. ________________ If two amino acids bind together, releasing a water molecule, this is called a ____ reaction.