MULTIPLE CHOICE. There are 60 questions on this exam. All answers go on the Scantron. Choose the one alternative that best completes the statement or answers the question.

1. The cell theory is one of the unifying themes of biology. Which of the following statements would be part of the cell theory?

A) All life is made of cells.  
B) Cells are the smallest units of life.  
C) Cells come from preexisting cells.  
D) All of the above

2. You are told that the cells on a microscope slide are plant, animal, or bacterial. You look at them through a microscope and see cell walls and membrane-bound organelles. You conclude that the cells

A) are plant cells.   
B) could be either plant or bacterial.   
C) are animal cells.   
D) could be plant, animal, or bacterial.  
E) are bacteria.

3) All cells

A) are enclosed in a membrane that maintains internal conditions different from the surroundings.  
B) can interconvert chemical materials.  
C) have DNA as the genetic material.  
D) can interconvert forms of energy.  
E) All of the choices are correct.

4) Cells are small because as cell size increases, the

A) volume and surface area decrease.  
B) volume increases faster than the surface area.  
C) surface area and volume increase at the same rate.  
D) surface area increases faster than the volume.

5) The diameter of most animal and plant cells ranges from

A) 1.0 to 10 microns.   
B) 0.01 to 0.1 microns.  
C) 10 to 100 microns.   
D) 100 to 1000 microns.   
E) 0.1 to 1.0 microns.

6) The image on the left is a picture of a single-celled organism named Euglena. The specimen was viewed with a(n)

A) Light microscope  
B) Fluorescence microscope  
C) Transmission electron microscope  
D) Scanning electron microscope  
E) Dissecting microscope

7) Light microscopes

A) work by reflecting electrons off the surface of an object being studied.  
B) can generally magnify objects about 10,000 times without blurring.  
C) use light and glass lenses to magnify an image.  
D) typically provide more resolution than an electron microscope.  
E) All of the choices are correct.

8) A scraping of material from a person’s tooth revealed many bacteria found on the tooth surface. Such bacteria remain attached to the tooth surface by structures called

A) pili  
B) anchoring junctions  
C) mitochondria  
D) flagella

9) Rods, spheres and spirals are shapes of cells observed in

A) plants  
B) animals  
C) fungi  
D) bacteria

10) Cells without a membrane-bound nucleus and membrane systems in the cytoplasm are ____ cells.

A) prokaryotic  
B) eukaryotic  
C) fungal  
D) protest  
E) more than one answer is correct
11) Most organelles in a eukaryotic cell are found in the
A) cell wall  B) cytoplasm  C) nucleus  D) capsule

12) A bacterial cell's DNA is found in its
A) capsule.   B) nucleoid region.   C) nucleus.   D) ribosomes.
E) Bacteria do not have DNA

13) Which one of the following is not found in prokaryotic cells?
A) ribosomes  B) a membrane-bound nucleus  C) a cell wall
D) a capsule  E) pili

14) Bacteria do not have a nucleus. Since the nucleus contains DNA, it can be concluded that bacteria do not contain DNA.
A) True  B) False

15) The nucleus of a cell
A) is the region of the cell where ribosomes are degraded.
B) contains DNA and controls cell activities
C) is contained inside the nucleolus.
D) is surrounded by a single layer of membrane.

16) Organelles found outside a eukaryotic cell and usually involved in movement of the cell or movement of substances past the cell are called
A) cilia and flagella  B) Cell walls and plasmodesmata
C) Nucleus and nucleolus  D) cytoplasm and endoplasm

17) In eukaryotic cells, internal membranes
A) provide additional area where many metabolic processes occur.
B) form membranous compartments called organelles.
C) contain proteins essential for metabolic processes.
D) greatly increase a cell's total membrane area.
E) All of the choices are correct.

18) The Golgi apparatus stores, modifies, and packages proteins and other products of metabolism.
A) True  B) False.

19) When a cell is deprived of oxygen, its lysosomes tend to burst and release their contents into the cell. (This statement is true.) As a result of this, that cell would be expected to
A) undergo self-digestion and die.  B) recycle damaged organelles.
C) produce additional ER.  D) undergo cell division.
E) produce replacement lysosomes.

20) Rough endoplasmic reticulum
A) contains ribosomes for protein synthesis.
B) creates an enormous surface area for cell metabolism
C) contains a compartment to transfer and modify products of metabolism
D) all of the above

21) The function of mitochondria is
A) intracellular transport of proteins.  B) photosynthesis.  C) intracellular digestion.
D) cellular respiration (ATP synthesis)  E) lipid synthesis.
22) Insulin is a protein that is produced by certain pancreatic cells and secreted into the bloodstream. (This is true.) Which of the following choices best describes the route of insulin from its production to its exit from the cell?
A) rough ER, transport vesicles, cell membrane
B) rough ER, transport vesicles, Golgi apparatus, transport vesicles, cell membrane
C) rough ER, lysosomes, transport vesicles, cell membrane
D) rough ER, Golgi apparatus, smooth ER, cell membrane

23) Lysosomes
A) destroy harmful bacteria engulfed by white blood cells.
B) help to digest worn-out or damaged organelles.
C) recycle materials within the cell.
D) fuse with food vacuoles to expose nutrients to lysosomal enzymes.
E) All of the choices are correct.

24) The function of chloroplasts is
A) intracellular transport of proteins.  B) intracellular digestion.  C) lipid synthesis.
D) photosynthesis.  E) cellular respiration.

25) The cytoskeleton is a system of ___ in ___ cells.
A) proteins – prokaryotic  B) proteins – eukaryotic
C) DNA – prokaryotic  D) DNA – eukaryotic
D) more than one answer is correct

26) Microtubules, microfilaments and intermediate filaments are components of the
A) cell wall in plants  B) plasma membrane in prokaryotes
C) chromosome in eukaryotes  D) chromosome in prokaryotes
D) cytoskeleton

27) Which of the following functions could be assigned to the cytoskeleton?
A) chromosome movement during mitosis.
B) change in shape of an amoeba.
C) movement (streaming) of cytoplasm in plant cells
D) A & B
E) A, B & C

28) Eukaryotic cells have transport vesicles, endoplasmic reticulum, Golgi apparatus and a nuclear envelope. Taken together, all these membranes represent the
A) transfer system  B) nuclear system
C) endomembrane system  D) cytoskeletal system

29) The membranous compartmentalization of a cell
A) allows different metabolic processes to occur simultaneously.
B) divides the cell into two equal-sized halves.
C) requires the presence of a cell wall.
D) is common in prokaryotes and eukaryotes.
E) requires the presence of a large central vacuole.

30) Unlike animal cells, plant cells have _________ and _________ and _________.
A) chloroplasts . . . cell walls . . . mitochondria.
B) centrioles . . . cell walls . . . glyocalyx
C) chloroplasts . . . cell walls . . . vacuoles
D) centrioles . . . chloroplasts . . . vacuoles
E) chloroplasts . . . cell walls . . . nucleoplasm
31) The functions of the central vacuole of plant cells include _______
A) storing pigments that will help attract pollinating insects.
B) storing poisons.
C) storing products of metabolism (e.g. sugar in sugar beet root cell vacuoles)
D) helping increase the size of cells by absorbing water and producing pressure (turgor) against the wall.
E) All of the choices are correct.

32) The fluid mosaic model describes the plasma membrane as consisting of
A) two layers of phospholipids with protein sandwiched between them.
B) a protein bilayer with embedded phospholipids.
C) a phospholipid single layer with embedded proteins
D) a phospholipid bilayer with embedded proteins

33) Membrane phospholipids
A) have hydrophilic heads that face outward and are exposed to water.
B) have hydrophobic tails that face inward and are shielded from water.
C) Both A & B are correct
D) None of the choices are correct.

34) The cholesterol associated with cell membranes
A) is attached to membrane proteins and extends into the watery environment surrounding the cell.
B) helps to stabilize the cell membrane at higher or lower temperature.
C) is an abnormality resulting from a diet high in cholesterol.
D) makes the cell membrane fluid at room temperature.
E) None of the choices are correct.

35) Low density lipoproteins (LDL’s or bad cholesterol) are taken up “in-bulk” into the cytoplasm of a cell. This process is an example of
A) endocytosis.   B) exocytosis.   C) molecular transport.
D) osmosis.   E) diffusion.

36) Diffusion does not require the cell to expend ATP. Therefore, diffusion is considered a type of

37) Which of the following is not a true statement about diffusion? Diffusion
A) occurs from a high to a low concentration  B) occurs from a low to a high concentration

38) A major function of glycoproteins and glycolipids in the cell membrane is to
A) allow the cells to recognize each other.   B) help the cell retain its shape.
C) help the cell resist swelling.   D) glue cells together to form tissues.
E) attach the cell membrane to the cytoskeleton.

39) The act of a white blood cell engulfing a bacterium is
A) endocytosis  B) exocytosis.   C) osmosis.   D) diffusion.

40) Which one of the following is not a function of the plasma membrane? The plasma membrane
A) has receptors for chemical messages.   B) plays a role in signal transduction.
C) is involved in self-recognition.   D) is the control center of the cell.
E) forms a selective barrier around the cell.

41) Which one of the following is not a function of membrane proteins? Membrane proteins
A) provide cellular identification tags.   B) attach the membrane to the cytoskeleton.
C) serve as enzymes.   D) form junctions between cells.
E) All of the choices are membrane protein functions.
42) Which one of the following processes could result in the net movement of a substance into a cell, if the substance is more concentrated in the cell than in the surroundings?
A) active transport   B) diffusion   C) osmosis
D) facilitated diffusion   E) None of the choices are correct.

43) What is the immediate source of energy for active transport?
A) carbohydrates  B) lipids  C) ATP  D) A & B

44) Which of the following terms is used to describe a membrane protein capable of moving substances from a low to a high concentration?
A) transporter   B) pump   C) diffuser   D) oxidizer   E) reducer

45) Active transport
A) can move solutes up a concentration gradient.  B) requires the cell to expend energy.
C) uses ATP as an energy source.  D) is necessary to allow nerves to function properly.
E) All of the choices are correct.

46) Passive movement of a molecule across a biological membrane requires _______ and moves a substance ______ its concentration gradient.
A) transport proteins . . . against  B) energy . . . down  C) energy and transport proteins . . . down
D) transport proteins . . . down  E) energy and transport proteins . . . against

47) The model on the left shows small molecules moving through a large “porous” opening. What kind of macromolecule would you expect the opening to be?
A) phospholipid  B) protein  C) nucleic acid  D) molecular sieve

48) When physicians perform an organ transplant, they choose a donor whose tissues match those of the recipient as closely as possible. Which of the following cell components are being matched?
A) plasma membrane phospholipids  B) cell-surface carbohydrates
C) plasma membrane proteins  D) cytoskeletal elements

49) Since cholesterol is a lipid, it diffuses easily into (or out of) cells because it interacts with the nonpolar regions of phospholipids. (Hint: Think about LDL discussed in class.)
A) True  B) False

50. Examine the diagram on the left. The process illustrated by the neurotransmitter leaving the sending neuron is called
A) endocytosis  B) exocytosis  C) passive transport  D) protein synthesis  E) transporter reuptake

END