Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

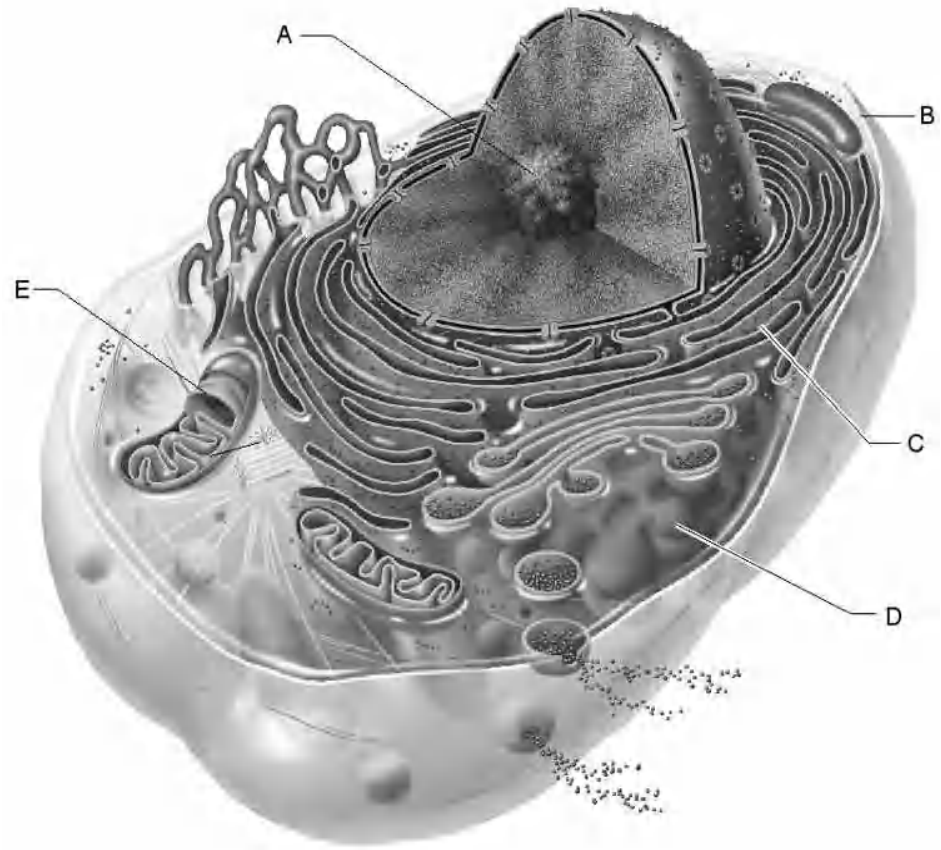

Figure 2.1

Use the diagram above to answer the following questions.

1) Which letter indicates the rough endoplasmic reticulum?
A) A B) B C) C D) D E) E
1) _____

2) Which letter indicates the nucleolus?
A) A B) B C) C D) D E) E
2) _____

3) Which letter indicates the plasma membrane?
A) A B) B C) C D) D E) E
3) _____

4) Which letter indicates the mitochondrion?
A) A B) B C) C D) D E) E
4) _____

5) Which letter indicates the Golgi apparatus?
A) A B) B C) C D) D E) E
5) _____

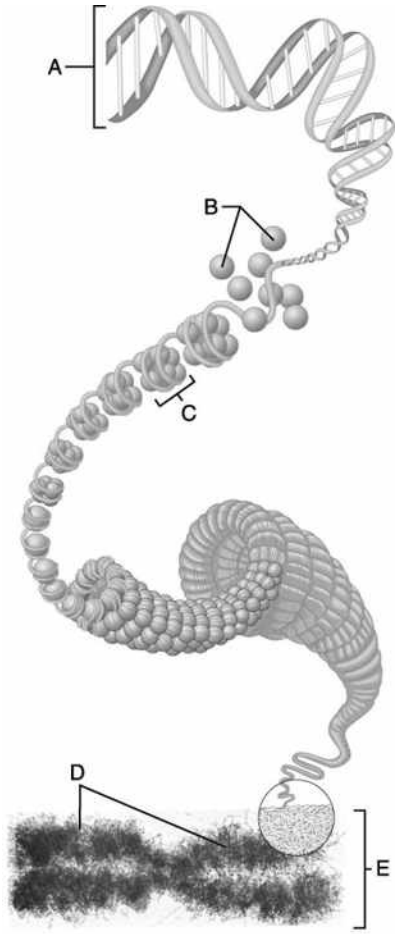

Figure 2.2

Use the diagram above to answer the following questions.

6) Which letter indicates the DNA molecule?
A) A B) B C) C D) D E) E
6) _____

7) Which letter indicates the chromatid?
A) A B) B C) C D) D E) E
7) _____

8) Which letter indicates a nucleosome?
A) A B) B C) C D) D E) E
8) _____

9) Which letter indicates histones?
A) A B) B C) C D) D E) E
9) _____

10) Which letter indicates the metaphase chromosome?
A) A B) B C) C D) D E) E
10) _____

11) This organelle is involved in production of cellular energy.
A) Golgi apparatus
11) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

12) This organelle is characterized by folded membranes called cristae.
A) Golgi apparatus
12) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

13) When a phagocytic white blood cell ingests a foreign bacterial cell, the vesicle fuses with this organelle. 13) _____

A) Golgi apparatus
B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

14) This membranous organelle is the site of protein synthesis for proteins that are secreted by the cell. 14) _____

A) Golgi apparatus
B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

15) This organelle detoxifies a number of toxic substances.
A) Golgi apparatus
15) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria

E) peroxisome

16) Cisternae of this organelle are continuous with the nuclear envelope.
A) Golgi apparatus
16) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

17) This organelle has both a cis and a trans face.
A) Golgi apparatus
17) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

18) This membranous organelle contains oxidase and catalase enzymes.
A) Golgi apparatus
18) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

19) These organelles are often called the "demolition crew" of the cell.
A) Golgi apparatus
19) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

20) This organelle primarily modifies products from the rough ER, and it resembles a stack of hollow saucers, one cupped inside the next. 20) _____

A) Golgi apparatus
B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

21) This organelle is primarily a sac of powerful digestive enzymes called acid hydrolases.
A) Golgi apparatus
21) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

22) This organelle is defective in the inherited disorder Tay-Sachs disease.
A) Golgi apparatus
22) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

23) This organelle is numerous in liver and kidney cells.
A) Golgi apparatus
23) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

24) This organelle produces ATP molecules.
A) Golgi apparatus
24) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

25) This organelle contains a single DNA molecule and is capable of self-replication.
A) Golgi apparatus
25) _____

B) lysosome
C) rough endoplasmic reticulum
D) mitochondria
E) peroxisome

26) Mitosis refers only to nuclear division. Separation of the entire cell following mitosis is
A) meiosis. B) karyokinesis. C) telophase. D) cytokinesis.
26) _____

27) Phospholipids of the plasma membrane are arranged
A) in a single layer with polar heads facing outwards.
27) _____

B) as a bilayer with their polar heads sandwiched between the nonpolar tails.

C) as a bilayer with their nonpolar tails sandwiched between the polar heads.
D) around a central layer of cholesterol.

28) Which of the following cytoskeleton elements are the largest in diameter?
A) microtubules B) centrioles
28) _____

C) intermediate filaments D) microfilaments

29) Which of the following statements about integral proteins in the plasma membrane is *false*?
A) They are more abundant by volume than the membrane phospholipids.
29) _____

B) Most extend all the way through the membrane.
C) Some attach to the glycocalyx.
D) They determine which molecules are transported through the membrane.

30) Which type of endocytosis ingests the most specific type of molecule?
A) pinocytosis B) fluid-phase endocytosis
30) _____

C) receptor-mediated endocytosis D) phagocytosis

31) Hormones are secreted by
A) exocytosis. B) phagocytosis. C) pinocytosis. D) osmosis.
31) _____

32) Of the following, the only organelle that has a double membrane structure is the
A) endoplasmic reticulum. B) Golgi apparatus.
32) _____

C) centriole. D) mitochondrion.

33) Functions of the Golgi apparatus include all of the following *except*
A) plasma membrane formation. B) synthesis of lysosomes.
33) _____

C) production of secretory granules. D) DNA replication.

34) Which of the following statements about the rough endoplasmic reticulum is *false*?
A) It consists of stacked envelopes called cisternae.
34) _____

B) It makes the digestive enzymes contained in the lysosomes.
C) It makes the integral proteins of the cell membrane.
D) It stores lipids as inclusions.

35) Which of the following is *not* a cytoskeleton element?
A) intermediate filament B) microfilament
35) _____

C) centriole D) microtubule

36) Which type of proteins are required for exocytosis?
A) SNARE proteins B) clathrin
36) _____

C) coatomer proteins D) caveolin

37) In chromatin, the DNA molecule wraps around proteins called
A) integral protein. B) histones.
37) _____

C) nucleotides. D) codons.

38) In the cell life cycle, DNA is replicated during
A) interphase G_1. B) interphase S.C) prophase II. D) prophase I.
38) _____

39) The longest arrays of microtubules that assemble from each centrosome during prophase form filaments called
39) _____

A) kinetochores. B) mitotic spindle fibers.
C) the nuclear envelope. D) asters.

40) During anaphase, motor proteins attached to mitotic spindle fibers serve to
A) pull together the replicated chromosomal strands.
40) _____

B) form the aster.
C) re-form the nuclear envelope.
D) pull the chromosomes to opposite poles of the cell.

41) The _____ face of the Golgi apparatus is _____ to receive spherical vesicles from the rough endoplasmic reticulum. 41) _____

A) cis; flattened B) trans; concave C) trans; convex D) cis; convex

42) Which membranous organelle stores calcium and is a primary site of lipid metabolism?
A) peroxisome B) Golgi apparatus
42) _____

C) smooth endoplasmic reticulum D) mitochondrion

43) Which organelle is important in neutralizing free radicals?
A) peroxisome B) Golgi apparatus
43) _____

C) mitochondrion D) lysosome

44) Which of the following statements accurately describes the function of the nuclear envelope?
A) protein synthesis

44) _____

B) regulation of passage of substances into and out of the cell membrane
C) separation of nucleoplasm and cytoplasm
D) transcription of DNA

45) Peroxisomes function to
A) store cellular free radicals.
45) _____

B) produce pigments.
C) regulate membrane permeability.
D) synthesize and degrade hydrogen peroxide.

46) Dyneins and kinesins are motor proteins that
A) enable a cell to send out and retract extensions called pseudopods.
46) _____

B) move organelles along microtubules through the cytoplasm.
C) resist pulling forces that are placed on cells.
D) are molecular components of telomeres.

47) Cell division is analogous to
A) a building forming another building by random accumulation of materials.
47) _____

B) a building duplicating its blueprint and then forming a new building by splitting in two.
C) two buildings duplicating their parts and fusing.
D) a building forming another building through a loss of some of its parts.

48) The plasma membrane is important for all the following reasons *except*
A) it determines what substances enter and exit the cell.
48) _____

B) it is an important site for DNA transcription.
C) it separates the ECF from the ICF.
D) it acts as a site for cell-to-cell interaction and recognition.

49) The plasma membrane is composed of all of the following *except*
A) phospholipids. B) tubulin protein.
49) _____

C) cholesterol. D) glycoproteins.

50) Materials that are to be exocytosed by cells are enclosed in vesicles synthesized by the
A) nucleosome. B) ribosome.
50) _____

C) mitochondrion. D) Golgi apparatus.

51) Which of the following does *not* pass through nuclear pores?

A) ribosomal RNA B) chromatin
51) _____

C) proteins D) messenger RNA

52) Which of the following is associated with protein synthesis?
A) smooth endoplasmic reticulum B) chloroplasts
52) _____

C) ribosomes D) mitochondria

53) Ribosomes may be either free within the cytoplasm or bound to a membrane system known as the
A) rough endoplasmic reticulum. B) Golgi apparatus.
53) _____

C) cytoskeleton. D) microtubule organizing center.

54) Which is *not* part of interphase?
A) S B) G_1 C) G_2 D) M
54) _____

55) Embedded in the plasma membrane of cells, cholesterol molecules act to
A) make the membrane more resistant to freezing.
55) _____

B) destabilize the membrane, leading to heart attacks.
C) participate in pinocytosis.
D) stabilize the membrane.

56) The endocytotic process in which small vesicles of fluid are brought into the cell is called
A) xenocytosis. B) phagocytosis. C) exocytosis. D) pinocytosis.
56) _____

57) The double membrane structure is unique to the
A) nucleolus. B) peroxisome.
57) _____

C) lysosome. D) mitochondrion.

58) Peroxisomes
A) synthesize proteins for use outside the cell.
58) _____

B) are involved in the production of ATP.
C) contain some of the code necessary for their own duplication.
D) are the toxic waste removal system of the cell.

59) The stiffest elements of the cytoskeleton, analogous to the bones of the human body, are
A) the cytosol. B) microtubules.
59) _____

C) intermediate filaments. D) microfilaments.

60) The mitotic spindle forms from the
A) centrosome matrix. B) nucleus.
60) _____

C) Golgi apparatus. D) nucleolus.

61) The nuclear envelope is continuous with the rough ER, but it differs from the rough ER in that it
A) consists of two membranes separated by a space.
61) _____

B) is not associated with ribosomes.
C) consists of tubes, like the smooth ER.
D) has unique pores.

62) Membrane-bound organelles have the same type of membrane as the plasma membrane *except*
A) for the absence of a glycocalyx. B) for the absence of cholesterol.
62) _____

C) they are all covered with ribosomes. D) the nonpolar tails face outward.

63) In the process of phagocytosis, the organelles whose enzymes break down ingested foreign cells are the 63) _____

A) nucleoli. B) lysosomes.
C) peroxisomes. D) smooth endoplasmic reticulum.

64) During mitosis, the kinetochore microtubules of the mitotic spindle
A) push on the chromatids.
64) _____

B) anchor the centriole to the cell membrane.
C) attach to chromatids and align them at the metaphase plate.
D) push the two poles of the cell apart.

65) The theory proposing that aging results from the effects of free radicals is primarily a theory of
A) genetically programmed aging. B) progressive disorder of immunity.
65) _____

C) wear and tear. D) cross-linking of glucose.

66) The cytoskeletal elements that are analogous to the muscles of the body which generate pseudopodia and contractile forces in conjunction with myosin are 66) _____

A) microfilaments. B) microtubules.
C) intermediate filaments. D) integral proteins.

67) Transcription of DNA requires the presence of
A) nucleosomes. B) histones.
67) _____

C) extended chromatin. D) centrosomes.

68) The process of cellular aging may involve all of the following *except*
A) decreased production of lysosomes. B) excessive metabolic rate.
68) _____

C) progressive shortening of telomeres. D) accumulated damage by free radicals.

69) During what phase of mitosis does the mitotic spindle break down and disappear?
A) anaphase B) telophase C) late prophase D) metaphase
69) _____

70) The cytoskeletal elements that form a ring to "squeeze" the two daughter cells apart during cytokinesis are 70) _____

A) intermediate filaments. B) microfilaments.
C) microtubules. D) the microtrabecular lattice.

71) During what phase of the cell cycle is the DNA duplicated?
A) anaphase B) prophase C) interphase D) metaphase
71) _____

72) The plasma membrane is
A) the membrane surrounding the cell.
72) _____

B) a single-layered membrane enclosing the plasma.
C) a single-layered membrane that surrounds the nucleus of the cell.
D) a membrane composed of tiny shelves or cristae.

73) The cell that gathers information and controls body functions is a
A) macrophage. B) neuron. C) fat cell. D) sperm cell.
73) _____

74) The temporary structures in the cytoplasm include all of the following *except*
A) the Golgi apparatus. B) pigments.
74) _____

C) glycosomes. D) lipid droplets.

75) Which of the following is an inclusion, *not* an organelle?
A) microtubule B) glycosome C) mitochondrion D) lysosome
75) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.
76) The smooth ER contains its own molecules of DNA. 76) _____

77) Hypercholesterolemia is an inherited disease in which the body's cells lack the protein receptors that bind to cholesterol-delivering LDLs. 77) _____

78) Ribosomes consist of two subunits, each surrounded by a membrane. 78) _____

79) Peroxisomes are important in detoxification of a number of toxic substances, for instance, hydrogen peroxide. 79) _____

80) The nucleolus serves as the cell's ribosome-producing machine. 80) _____

81) Microtubules are composed of actin.81) _____

82) Chromatin is composed of DNA wound around proteins known as actin. 82) _____

83) An example of a type of cell with high rates of mitosis is a cell of the skin. 83) _____

84) During the S phase, cells are characterized by rapid growth. 84) _____

85) During the G_1 phase, DNA is replicated in the cytoplasm. 85) _____

86) Telomeres are structures that limit the maximum number of times cells can divide. 86) _____

87) Extended chromatin is tightly wound around histones. 87) _____

88) A mitotic spindle develops during early telophase of mitosis. 88) _____

89) During anaphase, the chromosomes are moved to the center of the cell. 89) _____

90) Cytokinesis is the physical division of the cytoplasm between the two newly formed cells that result from mitosis. 90) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

91) This phase is the physical division of the cytoplasm between the two newly formed cells that result from mitosis. 91) _____

92) What is the transport mechanism by which substances move from the cytoplasm to the outside of the cell? 92) _____

93) Cell aging may be related to production of what charged molecules produced by the mitochondria? 93) _____

94) Identify the two different types of membrane-associated molecules that comprise the glycocalyx. 94) _____

95) What would extended chromatin wrapped around a group of eight histones be called? 95) _____

96) This is the phase in which a cell grows and carries on all its usual metabolic activities. 96) _____

97) These are the smallest living units in the body. 97) _____

98) This is the outermost continuous boundary of a human cell. 98) _____

99) This is the name for the currently held theory describing the plasma membrane structure. 99) _____

100) The phospholipid molecules of the plasma membrane are primarily composed of _____. 100) _____

101) This network of rods running throughout the cytosol acts as a cell's "bones," "muscles," and "ligaments." 101) _____

102) This is the mechanism by which large particles and macromolecules enter a cell. 102) _____

103) This is the diffusion of water molecules across a membrane. 103) _____

104) This is the type of protein involved in transport mechanisms across the plasma membrane. 104) _____

105) This is an inherited disease that leads to an accumulation of undigested glycolipids especially in the lysosomes of neurons. 105) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

106) Differentiate phagocytosis from receptor-mediated endocytosis.

107) Describe how cellular differentiation results in structural variation among cells in the human body.

108) Describe the two checkpoints that occur during interphase.

109) Describe the mitochondria.

110) Describe the three major types of cytoskeletal elements.

1) C
2) A
3) B
4) E
5) D
6) A
7) D
8) C
9) B
10) E
11) D
12) D
13) B
14) C
15) E
16) C
17) A
18) E
19) B
20) A
21) B
22) B
23) E
24) D
25) D
26) D
27) C
28) A
29) A
30) C
31) A
32) D
33) D
34) D
35) C
36) A
37) B
38) B
39) B
40) D
41) D
42) C
43) A
44) C
45) D
46) B
47) B
48) B
49) B
50) D

51) B
52) C
53) A
54) D
55) D
56) D
57) D
58) D
59) B
60) A
61) D
62) A
63) B
64) C
65) C
66) A
67) C
68) A
69) B
70) B
71) C
72) A
73) B
74) A
75) B
76) FALSE
77) TRUE
78) FALSE
79) TRUE
80) TRUE
81) FALSE
82) FALSE
83) TRUE
84) FALSE
85) FALSE
86) TRUE
87) FALSE
88) FALSE
89) FALSE
90) TRUE
91) cytokinesis
92) exocytosis
93) radicals (free radicals)
94) glycolipids and glycoproteins
95) a nucleosome
96) G1 phase of interphase
97) cells
98) plasma membrane (plasmalemma)
99) fluid mosaic model
100) a non-polar tail comprised of 2 fatty acid chains attached to a polar head
101) cytoskeleton

102) endocytosis
103) osmosis
104) integral proteins (transmembrane proteins)
105) Tay-Sachs disease
106) In phagocytosis, the cell extends pseudopods and engulfs the foreign protein/foreign cell, which is often degraded after the phagocytic vesicle fuses with a lysosome. In receptor-mediated endocytosis, specific membrane receptors bind specific extra-cellular molecules. Once bound, the membrane deforms inward, creating a vesicle with the receptors and molecules inside. The vesicle contents are released into the cytoplasm or fuse with a lysosome, with the receptors recycled back to the membrane.
107) Cellular differentiation is the result of highly regulated gene activation/inactivation in the developing embryo. The products of gene activation are proteins. As the embryo develops, certain cells will begin to produce proteins that neighboring cells do not produce. As development progresses, these unique protein "signatures" lead to differences in cellular function. For example, in muscle cells actin and myosin proteins predominate which results in their unique contractile properties.
108) The $G_{1\ checkpoint}$ ensures that the cell has reached a maximum size and has replicated the necessary organelles and enzymes to synthesize DNA. The $G_{2\ checkpoint}$, checks to see whether replication errors or DNA damage has occurred during DNA synthesis.
109) These are long, thin organelles, that have their own DNA molecule which allows for self-replication. They produce ATP molecules, which are the equivalent of cellular energy. They are bound by two membranes. The inner one is highly folded into cristae, where many of the critical molecules involved in ATP production are imbedded.
110) Microtubules are the largest in diameter and are formed by the protein tubulin. They are stiff, but bendable. Microtubules are important in the trafficking of organelles within the cytoplasm. Microfilaments are the smallest in diameter. They are strands of the protein actin, are contractile proteins, which are typically very labile. Intermediate filaments are of intermediate diameter. They are very stabile and permanent, functioning to resist shearing forces within and between adjacent cells.