

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

- 1) The part of a chromosome that shortens with each cell division, functioning as a "clock," is the 1) _____
A) centromere. B) centrosome. C) telomere. D) centriole.

Answer: C

- Explanation: A)
 B)
 C)
 D)

- 2) Human stem cells are valuable in drug development because they can be used to 2) _____
A) study the latest stages of the disease that would have unfolded if the person hadn't died.
B) grow human embryos in culture, on which drugs can be tested.
C) replace experimental animals such as rats and mice.
D) create experimental organisms, such as rats and mice.

Answer: C

- Explanation: A)
 B)
 C)
 D)

- 3) The internal architecture of a cell consists of 3) _____
A) chitin and chlorophyll.
B) microtubules, intermediate filaments, and microfilaments.
C) cilia and flagella.
D) lipid bilayers.

Answer: B

- Explanation: A)
 B)
 C)
 D)

- 4) Which of the following is a cure for people with recurrent infection from *Clostridium difficile*? 4) _____
- A) Renal transplantation
 - B) Genetic restructuring
 - C) Fecal transplantation
 - D) Grafting

Answer: C

Explanation: A)
B)
C)
D)

- 5) Organelles protect a cell by 5) _____
- A) containing powerful enzymes that kill any bacteria that enter.
 - B) sequestering biochemicals that could dismantle other cellular structures.
 - C) forming a thick outer barrier.
 - D) placing flag-like molecules on a cell's surface, which identify that cell as belonging to a particular person.

Answer: B

Explanation: A)
B)
C)
D)

- 6) Egg cells are 6) _____
- A) diploid germ cells.
 - B) diploid somatic cells.
 - C) haploid somatic cells.
 - D) haploid germ cells.

Answer: D

Explanation: A)
B)
C)
D)

- 7) The major macromolecules that make up cells are 7) _____
- A) vitamins and minerals.
 - B) eukaryotes, prokaryotes, and archaea.
 - C) carbohydrates, proteins, lipids, and nucleic acids.
 - D) carbon, hydrogen, nitrogen, oxygen, and phosphorus.

Answer: C

Explanation: A)
B)
C)
D)

- 8) "Adult" stem cells are more accurately called tissue-specific or somatic stem cells because 8) _____
- A) some adults do not have them.
 - B) they are also present in the tissues of embryos, fetuses, and children.
 - C) an adult body also contains embryonic stem cells.
 - D) whether they are present or not in an adult depends upon the individual's level of maturity.

Answer: B

Explanation: A)
B)
C)
D)

- 9) Which of the following is true of the human microbiome? 9) _____
- A) High blood sugar following weight-loss surgery is partly due to a changed gut microbiome.
 - B) Antibiotics do not alter the gut microbiome.
 - C) An altered microbiome hastens starvation in malnourished children.
 - D) The microbiome consists primarily of cells that belong to the human body.

Answer: C

Explanation: A)
B)
C)
D)

- 10) The organelle that consists of a stack of flat, membrane-enclosed sacs is the 10) _____
- A) nucleus.
 - B) Golgi apparatus.
 - C) mitochondrion.
 - D) nucleolus.

Answer: B

Explanation: A)
B)
C)
D)

- 11) A difference between a stem cell and a progenitor cell is that 11) _____
- A) progenitor cells are rare but stem cells are abundant.
 - B) a progenitor cell cannot self-renew and a stem cell can.
 - C) progenitor cells are not present in embryos but stem cells are.
 - D) a stem cell cannot self-renew and a progenitor cell can.

Answer: B

Explanation: A)
B)
C)
D)

- 12) Cilia are built of 12) _____
A) microtubules. B) micronutrients.
C) microorganisms. D) microfilaments.

Answer: A

Explanation: A)
B)
C)
D)

- 13) Select the true statement. 13) _____
A) Somatic cells are diploid, meaning that they have two copies of the human genome.
B) Stem cells are haploid, meaning that they have one copy of the human genome.
C) Sperm and egg cells are diploid, meaning that they have two copies of the human genome.
D) Somatic cells are haploid, meaning that they have one copy of the human genome.

Answer: A

Explanation: A)
B)
C)
D)

- 14) Which of the following bacteria benefits humans? 14) _____
A) Enteritis Salmonella B) Streptococcus Pyogenes
C) Salmonella Typhi D) Lactobacillus

Answer: D

Explanation: A)
B)
C)
D)

- 15) In mitochondria, 15) _____
A) all of a cell's DNA is replicated.
B) energy from nutrients is converted into a form that a cell can use.
C) fats and carbohydrates are degraded.
D) sugars are added to proteins.

Answer: B

Explanation: A)
B)
C)
D)

- 16) During apoptosis, caspases 16) _____
A) cause mitochondria to replicate their DNA.
B) alter the cell surface so that viruses can more easily enter.
C) remove introns from DNA.
D) activate enzymes that cut DNA into same-sized pieces.

Answer: D

Explanation: A)
B)
C)
D)

- 17) In a human cell, the genetic material is in the 17) _____
A) ribosome. B) cytoplasm. C) nucleus. D) lysosome.

Answer: C

Explanation: A)
B)
C)
D)

- 18) About _____ average-sized bacteria could fit into a human cell. 18) _____
A) 10 B) 1,000 C) 10,000 D) 100

Answer: B

Explanation: A)
B)
C)
D)

- 19) The two major stages of the cell cycle are 19) _____
A) mitosis and apoptosis. B) interphase and prophase.
C) mitosis and meiosis. D) interphase and mitosis.

Answer: D

Explanation: A)
B)
C)
D)

- 20) A researcher identifies an abnormality in a protein that causes a particular inherited illness. To develop a treatment, it would be most helpful to know 20) _____
- A) the other types of molecules that cause or contribute to the disease.
 - B) how the mutation was caused.
 - C) if this type of mutation occurs in all species.
 - D) which cells are affected and how to replace the protein's function in them.

Answer: D

Explanation: A)
B)
C)
D)

- 21) Humans belong to domain _____, which is distinguished by cells that have _____ 21) _____
- A) Archaea; ancient organelles
 - B) Prokarya; organelles
 - C) Eukarya; organelles
 - D) Prokarya; proteins

Answer: C

Explanation: A)
B)
C)
D)

- 22) At the point in the cell cycle when mitosis begins 22) _____
- A) each chromosome consists of two identical chromatids joined at the centromere.
 - B) the number of chromosomes is reduced to half.
 - C) the cell enters a dormant phase.
 - D) DNA replication begins.

Answer: A

Explanation: A)
B)
C)
D)

- 23) The cell cycle is a series of events a cell undergoes as it prepares to 23) _____
- A) pass along a signal.
 - B) die.
 - C) adhere to another cell.
 - D) divide.

Answer: D

Explanation: A)
B)
C)
D)

24) A type of vesicle that ferries molecules, such as cholesterol, to lysosomes is an _____
A) ectosome. B) episome. C) oprahsome. D) endosome.

Answer: D

Explanation: A)
 B)
 C)
 D)

25) A molecule that binds a cell surface receptor is called a _____
A) ligand. B) nuclear pore. C) peroxisome. D) nucleic acid.

Answer: A

Explanation: A)
 B)
 C)
 D)

26) The defining characteristic of a stem cell is _____
A) its origin from a progenitor cell. B) self-renewal.
C) the ability to turn into a cancer cell. D) self-repair.

Answer: B

Explanation: A)
 B)
 C)
 D)

27) The cell type with the most mitochondria is _____
A) sperm. B) fat. C) nerve. D) muscle.

Answer: D

Explanation: A)
 B)
 C)
 D)

28) The nuclear lamina is _____
A) part of the nucleus that holds RNA.
B) a fibrous layer that lines the inner face of the nuclear membrane.
C) the sac that holds the genetic material.
D) the site of protein synthesis.

Answer: B

Explanation: A)
 B)
 C)
 D)

29) The order of events in the cell cycle is

A) G_1 to S to G_2 to mitosis.

C) Mitosis to G_1 to G_2 to S.

B) G_1 to G_2 to S to mitosis.

D) S to G_1 to G_2 to mitosis.

29) _____

Answer: A

Explanation: A)

B)

C)

D)

30) The cells within and on us that are not actually of us constitute the

A) parasite family.

C) cytoskeleton.

B) exome.

D) human microbiome.

30) _____

Answer: D

Explanation: A)

B)

C)

D)

31) Cristae are

A) bits of sugars in the Golgi apparatus.

B) types of insects.

C) types of genes.

D) membranous structures that are parts of mitochondria.

31) _____

Answer: D

Explanation: A)

B)

C)

D)

32) DNA replicates during the _____ phase of the cell cycle.

A) G_1

B) S

C) G_2

D) G_3

32) _____

Answer: B

Explanation: A)

B)

C)

D)

33) Cells contain twice the normal number of independent chromosomes briefly during 33) _____
A) prophase. B) metaphase. C) telophase. D) anaphase.

Answer: D

Explanation: A)
B)
C)
D)

34) A cell that can divide to give rise to any cell type, including those of membranes that 34) _____
support the developing embryo, is

- A) a progenitor cell. B) multipotent.
C) a differentiated cell. D) totipotent.

Answer: D

Explanation: A)
B)
C)
D)

35) Which type of components aggregate and interact to form the epithelial, connective, 35) _____
muscle, and nerve tissues in the human body?

- A) Differentiated cells B) Stem cells
C) Secondary meristems D) Prokaryotic cells

Answer: A

Explanation: A)
B)
C)
D)

36) Apoptosis is a form of 36) _____
A) programmed cell division that is a normal part of development.

- B) programmed cell death that is a normal part of development.
C) cellular duplication.
D) cellular adhesion.

Answer: B

Explanation: A)
B)
C)
D)

- 37) Which of the following acts as a quality control center for cells? 37) _____
- A) Endoplasmic reticulum
 - B) Lysosome
 - C) Nuclear lamina
 - D) Plasma membrane

Answer: A

- Explanation:
- A)
 - B)
 - C)
 - D)

- 38) Based on the composition of the plasma membrane, how do you predict a protein with one section of hydrophobic amino acids and one section of hydrophilic amino acids would be situated in the membrane? 38) _____

- A) The hydrophilic portion of the protein could embed in the membrane, and the hydrophobic portion could extend into the cell.
- B) The hydrophobic portion of the protein could embed in the membrane, and the hydrophilic portion could extend into the cell.
- C) Both the hydrophobic and hydrophilic portions of the protein could embed in the membrane.
- D) This protein could not be found in the membrane.

Answer: B

- Explanation:
- A)
 - B)
 - C)
 - D)

- 39) Factors that control how often a cell divides include 39) _____

- A) where chromosomes are located within the nucleus.
- B) which chromosomes are active and which are not.
- C) telomere lengths, hormonal signals, crowding, and growth factors.
- D) the activity level of the person, diet, and environmental exposures.

Answer: C

- Explanation:
- A)
 - B)
 - C)
 - D)

- 40) An experimental treatment for amyotrophic lateral sclerosis (Lou Gehrig's disease), which causes gradual loss of the ability to move, sends four genes into cells sampled from a patient's skin. This procedure reprograms the cells, which are then exposed to molecules and genes that stimulate them to develop as healthy versions of the cells affected in the disease. These cells are implanted into the patient. They are _____
- A) apoptotic cells.
 - B) embryonic stem cells.
 - C) induced pluripotent stem cells.
 - D) adult connective tissue stem cells.

Answer: C

Explanation: A)
B)
C)
D)

- 41) The cellular basis of muscular dystrophy is that some of a child's muscle cells _____
- A) have too much of a contractile protein and become weak.
 - B) lack DNA.
 - C) have combined into a structure that cannot contract.
 - D) lack a protein that enables them to withstand the force of contraction.

Answer: D

Explanation: A)
B)
C)
D)

- 42) Ribosomes are in the cells of _____
- A) eukaryotes only.
 - B) vertebrates only.
 - C) animals only.
 - D) all organisms.

Answer: D

Explanation: A)
B)
C)
D)

- 43) Human embryonic stem cells that are used in research are _____
- A) taken from stillbirths that do not have genetic diseases.
 - B) cultured in the bodies of human embryos from outer cell mass cells.
 - C) cultured in laboratory dishes from inner cell mass cells taken from a very early embryo.
 - D) taken from aborted human fetuses between 10 and 12 weeks of gestation.

Answer: C

Explanation: A)
B)
C)
D)

44) Which of the four major chemicals found in cells comprise telomeres? 44) _____
A) Proteins
B) Carbohydrates
C) Nucleic acids
D) Lipids

Answer: C

Explanation: A)
B)
C)
D)

45) What is the sequence of events involved in the production of proteins that is secreted? 45) _____
A) The protein is produced as a linear molecule in the nucleus, then exits through nuclear pores. On the ER the protein folds into its active form and at the Golgi apparatus is packed into a vesicle, which carries it across the plasma membrane and out of the cell.
B) A hormone signals the gene that encodes the protein to be transcribed into mRNA in the nucleus. The mRNA is translated into protein on the ER, then processed and folded in the Golgi apparatus, and then sent out of the cell in a vesicle.
C) A hormone signals a protein-filled vesicle to move from the plasma membrane into the cell and into the nucleus, where it stimulates transcription of the appropriate gene into mRNA. The mRNA exits the nucleus and is translated into protein on the ER and processed and folded in the Golgi apparatus. Finally, the protein is transported out of the cell in a vesicle.
D) A hormone binds to the plasma membrane, signaling proteins near the membrane to fall apart into amino acids. These enter the nucleus and stimulate replication of the gene encoding the protein.

Answer: B

Explanation: A)
B)
C)
D)

46) People with giant axons lose the ability to move and see because 46) _____
A) their hemoglobin leaks out of the cells of the body.
B) they lack a protein, called gigaxonin, which normally breaks down intermediate filaments and recycles their components.
C) they have an excess of CFTR proteins, which entrap salt inside cells.
D) apoptosis in their body rapidly and neatly dismantles cells into membrane-enclosed pieces that a phagocyte can mop up.

Answer: B

Explanation: A)
B)
C)
D)

- 47) The cytoskeletal component that consists of different protein types is: 47) _____
A) a fibrous filament. B) a microfilament.
C) a microtubule. D) an intermediate filament.

Answer: D

Explanation: A)
B)
C)
D)

- 48) Chromosomes coil tightly around chromosomal proteins and condense during 48) _____
A) metaphase. B) telophase. C) prophase. D) anaphase.

Answer: C

Explanation: A)
B)
C)
D)

- 49) The organelle that is the equivalent of a cellular garbage disposal system is the 49) _____
A) mitochondrion. B) glucosome.
C) lysosome. D) nucleus.

Answer: C

Explanation: A)
B)
C)
D)

- 50) During S phase, replicated chromosomes are joined at their 50) _____
A) middlemeres. B) centrosomes.
C) telomeres. D) centromeres.

Answer: D

Explanation: A)
B)
C)
D)