

b mitochondrion.

d cytoplasm.

ANSWER: A**POINTS: 0 / 1**

9 The organelle that modifies, sorts, and packages proteins is the

a endoplasmic reticulum.

c lysosome.

b ribosome.

d Golgi apparatus.

ANSWER: D**POINTS: 0 / 1**

10 Plant cells have a large membrane-bound compartment in which water, waste products, and nutrients can be stored. This compartment is called the

a mitochondrion.

c Golgi apparatus.

b chloroplast.

d central vacuole.

ANSWER: D**POINTS: 0 / 1**

11 The organelles associated with plant photosynthesis are the

a mitochondria.

c Golgi apparatus.

b chloroplasts.

d vacuoles.

ANSWER: B**POINTS: 0 / 1**12 All the following are found in both plant and animal cells, *except*

a a cell wall.

c mitochondria.

b a cell membrane.

d endoplasmic reticulum.

ANSWER: A**POINTS: 0 / 1**

13 Which type of molecule forms the cell membrane?

a protein

c nucleic acid

b phospholipid

d carbohydrate

ANSWER: B**POINTS: 0 / 1**

14 Proteins in the cell membrane that identify the cell are called

a cell-surface markers.

c enzymes.

b receptor proteins.

d transport proteins.

ANSWER: A**POINTS: 0 / 1**

15 Proteins that serve as tunnels for specific substances through the lipid bilayer are

a cell-surface markers.

c receptor proteins.

b channel proteins.

d enzymes.

ANSWER: B**POINTS: 0 / 1**16 Which of the following does *not* require energy?


a diffusion

c active transport

b endocytosis

d sodium-potassium pump


ANSWER: A
POINTS: 0 / 1

-  _____ **17** The diffusion of water into or out of a cell is called
- a solubility.
 - b osmosis.
 - c selective transport.
 - d endocytosis.


ANSWER: B
POINTS: 0 / 1

-  _____ **18** The sodium-potassium pump
- a is a carrier protein.
 - b uses passive transport.
 - c is located in the cytoplasm of a cell.
 - d transports sugar molecules.


ANSWER: A
POINTS: 0 / 1

-  _____ **19** Molecules that are too large to be moved across a cell membrane can be removed from the cell by
- a diffusion.
 - b exocytosis.
 - c endocytosis.
 - d osmosis.


ANSWER: B
POINTS: 0 / 1

-  _____ **20** Removing materials from a cell in vesicles is called
- a osmosis.
 - b diffusion.
 - c exocytosis.
 - d endocytosis.


ANSWER: C
POINTS: 0 / 1

-  _____ **21** Signal molecules bind to
- a carbohydrates.
 - b marker proteins.
 - c receptor proteins.
 - d transport proteins.


ANSWER: C
POINTS: 0 / 1

-  _____ **22** Most of the energy used by life on Earth comes from the
- a sun.
 - b rotation of Earth.
 - c moon.
 - d weather.

ANSWER: A
POINTS: 0 / 1


-  _____ **23** Light energy is converted to chemical energy through the process of
- a cellular respiration.
 - b fermentation.
 - c photosynthesis.
 - d glycolysis.

ANSWER: C
POINTS: 0 / 1


-  _____ **24** During the final stage of photosynthesis, sugars are produced from
- a oxygen.
 - b sunlight.
 - c water.
 - d carbon dioxide.

ANSWER: D


POINTS: 0 / 1

-  — **25** As light intensity increases, the rate of photosynthesis
- a increases indefinitely.
 - b decreases indefinitely.
 - c increases until the light saturation point is reached.
 - d decreases until the light saturation point is reached.


ANSWER: C**POINTS:** 0 / 1

-  — **26** Low temperatures may cause photosynthesis to occur
- a more quickly.
 - b more slowly.
 - c at a constant rate.
 - d only in sunlight.


ANSWER: B**POINTS:** 0 / 1

-  — **27** Which of the following environmental factors does *not* affect the rate of photosynthesis?
- a oxygen concentration
 - b carbon dioxide concentration
 - c light intensity
 - d temperature


ANSWER: A**POINTS:** 0 / 1

-  — **28** The name of the process that takes place when organic compounds are broken down in the absence of oxygen is
- a respiration.
 - b oxidation.
 - c fermentation.
 - d photosynthesis.


ANSWER: C**POINTS:** 0 / 1

-  — **29** Fermentation enables glycolysis to continue under
- a anaerobic conditions.
 - b aerobic conditions.
 - c photosynthetic conditions.
 - d low-light conditions.


ANSWER: A**POINTS:** 0 / 1

-  — **30** If oxygen is absent during the second stage of cellular respiration,
- a fermentation will occur.
 - b the Krebs cycle begins.
 - c the electron transport chain works more efficiently.
 - d glycolysis stops.

ANSWER: A**POINTS:** 0 / 1

-  — **31** Cells produce ATP most efficiently in the presence of
- a water.
 - b carbon dioxide.
 - c oxygen.
 - d glucose.

ANSWER: C**POINTS:** 0 / 1

-  — **32** The chromosome of a bacterium

- a is wrapped around proteins.
- b has a circular shape.
- c occurs in multiple pairs within the cell.
- d is found within the nucleus.

ANSWER: B**POINTS: 0 / 1**

33 The region of a chromosome where two sister chromatids are held together is called a

- a spindle.
- b centromere.
- c nucleosome.
- d centriole.

ANSWER: B**POINTS: 0 / 1**

34 Chromatids are

- a dense patches within the nucleus.
- b bacterial chromosomes.
- c joined strands of duplicated genetic material.
- d prokaryotic nuclei.

ANSWER: C**POINTS: 0 / 1**

35 The phase of the cell cycle that occupies most of an average cell's life is

- a G_1 .
- b mitosis.
- c G_2 .
- d S.

ANSWER: A**POINTS: 0 / 1**

36 Mitosis is the process by which

- a microtubules are assembled.
- b cytoplasm is divided.
- c the nucleus is divided into two nuclei.
- d the cell rests.

ANSWER: C**POINTS: 0 / 1**

37 The phase of mitosis that is characterized by the arrangement of all chromosomes along the equator of the cell is called

- a telophase.
- b metaphase.
- c anaphase.
- d prophase.

ANSWER: B**POINTS: 0 / 1**

38 Which of the following is *not* a type of asexual reproduction?

- a budding
- b fragmentation
- c binary fission
- d fertilization

ANSWER: D**POINTS: 0 / 1**

39 Hydras reproduce by

- a budding.
- c binary fission.

b fragmentation.

d parthenogenesis.

ANSWER: A

POINTS: 0 / 1



40 Budding is an example of

a endosymbiosis.

c meiosis.

b asexual reproduction.

d sexual reproduction.

ANSWER: B

POINTS: 0 / 1



41 Binary fission

a occurs when two cells collide with each other.

b produces excess energy.

c creates new species.

d is the process by which bacteria reproduce.

ANSWER: D

POINTS: 0 / 1



42 The process of producing offspring is called reproduction and can be

a eukaryotic or prokaryotic.

c zygotic or gametic.

b asexual or sexual.

d haploid or diploid

ANSWER: B

POINTS: 0 / 1



43 Sexual reproduction includes

a budding.

c binary fission.

b fragmentation.

d fertilization

ANSWER: D

POINTS: 0 / 1



44 Normal human males develop from fertilized eggs containing which of the following sex chromosome combinations?

a XY

c XO

b XX

d OO

ANSWER: A

POINTS: 0 / 1



45 Homologous chromosomes are pairs of chromosomes containing genes that code for

a different traits.

c DNA.

b the same traits.

d sex.

ANSWER: B

POINTS: 0 / 1



46 The X and Y chromosomes are called

a extra chromosomes.

c sex chromosomes.

b homologous chromosomes.

d autosomes.

ANSWER: C

POINTS: 0 / 1

A haploid cell is one that

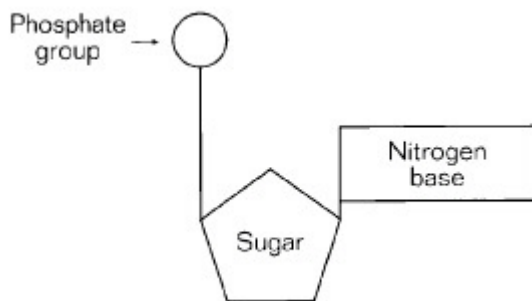
ANSWER: D
POINTS: 0 / 1

- 55 Avery and his research team concluded that
- RNA was the genetic material.
 - protein bases were the genetic material.
 - DNA and RNA were found in the human nucleus.
 - DNA was responsible for transformation.

ANSWER: D
POINTS: 0 / 1

- 56 The scientist who worked with Martha Chase to prove that genetic material is composed of DNA was
- Alfred Hershey.
 - Oswald Avery.
 - Francis Crick.
 - Rosalind Franklin.

ANSWER: A
POINTS: 0 / 1



- 57 The entire molecule shown in the diagram above is called a(n)
- amino acid.
 - nucleotide.
 - polysaccharide.
 - pyrimidine.

ANSWER: B
POINTS: 0 / 1

- 58 Watson and Crick built models that demonstrated that
- DNA and RNA have the same structure.
 - DNA is made of two strands that twist into a double helix.
 - guanine forms hydrogen bonds with adenine.
 - thymine forms hydrogen bonds with cytosine.

ANSWER: B
POINTS: 0 / 1

- 59 The scientists credited with establishing the structure of DNA are
- Avery and Chargaff.
 - Hershey and Chase.
 - Mendel and Griffith.
 - Watson and Crick.


ANSWER: D
POINTS: 0 / 1

- 60 X-ray diffraction photographs by Wilkins and Franklin suggested that
- DNA and RNA are the same molecules.
 - DNA is composed of either purines or pyrimidines, but not both.

- c DNA molecules are arranged as a tightly coiled helix.
- d DNA and proteins have the same basic structure.


ANSWER: C

POINTS: 0 / 1

-  _____ **61** The enzymes responsible for adding nucleotides to the exposed DNA bases during replication are
- a replicases.
 - b DNA polymerases.
 - c helicases.
 - d template enzymes.


ANSWER: B

POINTS: 0 / 1

-  _____ **62** The enzymes that unwind DNA during replication are called
- a double helixes.
 - b DNA helicases.
 - c forks.
 - d phages.


ANSWER: B

POINTS: 0 / 1

-  _____ **63** Transcription, which is a stage of gene expression, is the process by which genetic information encoded in DNA is transferred to a(n)
- a RNA molecule.
 - b DNA molecule.
 - c uracil molecule.
 - d tRNA molecule.


ANSWER: A

POINTS: 0 / 1

-  _____ **64** During transcription,
- a proteins are synthesized.
 - b DNA is replicated.
 - c RNA is produced.
 - d translation occurs.


ANSWER: C

POINTS: 0 / 1

-  _____ **65** Each nucleotide triplet in mRNA that specifies a particular amino acid is called a(n)
- a peptide bond.
 - b codon.
 - c anticodon.
 - d helicase.


ANSWER: B

POINTS: 0 / 1

-  _____ **66** Bacteria often have small extra loops of DNA called
- a nucleoids.
 - b pili.
 - c plasmids.
 - d prions.


ANSWER: C

POINTS: 0 / 1

-  _____ **67** Bacterial cells such as *Escherichia coli* transfer pieces of genetic material in a process called
- a binary fission.
 - b mitosis.
 - c conjugation.
 - d sexual reproduction.

ANSWER: C

POINTS: 0 / 1


-  _____ **68** The capsid of a virus is the
- a protective outer coat.
 - c nucleus.

b cell membrane.

d cell wall and membrane complex.


ANSWER: A

POINTS: 0 / 1

-  — **69** A virulent virus is one that
- a has only DNA.
 - b has only RNA.
 - c reproduces only with a lysogenic cycle.
 - d reproduces only with a lytic cycle.


ANSWER: D

POINTS: 0 / 1

-  — **70** The cycle of viral infection, replication, and cell destruction is called the virus's
- a lysogenic cycle.
 - b metabolic cycle.
 - c lytic cycle.
 - d provirus cycle.


ANSWER: C

POINTS: 0 / 1

-  — **71** The procedure used to identify the pathogen that causes a disease is
- a Fleming's postulates.
 - b method of contagion.
 - c steps of transmission.
 - d Koch's postulates.


ANSWER: D

POINTS: 0 / 1

-  — **72** Bacteria cause disease by
- a forming endospores.
 - b transduction.
 - c forming toxins.
 - d bursting host cells.


ANSWER: C

POINTS: 0 / 1

-  — **73** A pathogen is an agent that is
- a beneficial to humans.
 - b harmful only to plants.
 - c harmful to living organisms.
 - d nearly extinct.


ANSWER: C

POINTS: 0 / 1

-  — **74** When the volume of a cell increases, its surface area
- a increases at the same rate.
 - b remains the same.
 - c increases at a faster rate.
 - d increases at a slower rate.


ANSWER: D

POINTS: 0 / 1

-  — **75** Surface area is an important factor in limiting cell growth because
- a the cell can burst if the membrane becomes too large.
 - b materials cannot enter the cell if it is too large.
 - c the cell may become too large to take in enough food and to remove enough wastes.
 - d waste products cannot leave the cell if it is too small.


ANSWER: C

POINTS: 0 / 1

-  — **76** As cell size increases, the surface area-to-volume ratio
- | | |
|--------------|-----------------------------|
| a decreases. | c increases then decreases. |
| b increases. | d remains the same. |


ANSWER: A

POINTS: 0 / 1

-  — **77** Which of the following shapes would allow a cell to have the greatest surface area-to-volume ratio?
- | | |
|----------|------------------|
| a sphere | c egg-shaped |
| b cube | d broad and flat |


ANSWER: D

POINTS: 0 / 1

-  — **78** One difference between prokaryotes and eukaryotes is that prokaryotes do *not* have
- | | |
|--------------------|--------------|
| a DNA. | c cytoplasm. |
| b a cell membrane. | d a nucleus. |


ANSWER: D

POINTS: 0 / 1

-  — **79** Which cells have a cell membrane, cytoplasm, ribosomes, and DNA?
- | | |
|--------------------------|-------------------------|
| a only animal cells | c only eukaryotic cells |
| b only prokaryotic cells | d all cells |


ANSWER: D

POINTS: 0 / 1

-  — **80** Which of the following statements about prokaryotes is correct?
- | | |
|--|--|
| a They have a nucleus. | c The organelles in their cytoplasm are surrounded by membranes. |
| b Their evolution preceded that of eukaryotes. | d They are multicellular organisms. |


ANSWER: B

POINTS: 0 / 1

-  — **81** Only eukaryotic cells have
- | | |
|------------------------------|--------------|
| a DNA. | c ribosomes. |
| b membrane-bound organelles. | d cytoplasm. |


ANSWER: B

POINTS: 0 / 1


-  — **82** Microfilaments, microtubules, and intermediate fibers are three kinds of cytoskeleton
- | | |
|-------------------|---------------|
| a protein fibers. | c organelles. |
| b membranes. | d DNA. |

ANSWER: A


POINTS: 0 / 1

-  — **83** Where are bound ribosomes located?
- | |
|--|
| a suspended in the cytosol |
| b inside the nucleus |
| c attached to membranes of another organelle |
| d outside the cell membrane |


ANSWER: C
POINTS: 0 / 1

-  _____ **84** A cell that requires a lot of energy might contain large numbers of
 a chromosomes. c mitochondria.
 b vacuoles. d lysosomes.


ANSWER: C
POINTS: 0 / 1

-  _____ **85** Short, thick outgrowths that allow prokaryotes to attach to surfaces or each other are called
 a flagella. c microfilaments.
 b microtubules. d pili.


ANSWER: D
POINTS: 0 / 1

-  _____ **86** Which of the following is an example of a prokaryotic cell?
 a chloroplast c bacterium
 b fungus d muscle cell


ANSWER: C
POINTS: 0 / 1

-  _____ **87** Phospholipids are molecules that have
 a one polar phosphate head and two polar fatty acid tails.
 b one polar phosphate head and two nonpolar fatty acid tails.
 c one polar phosphate head and one polar fatty acid tail.
 d one nonpolar phosphate head and two polar fatty acid tails.


ANSWER: B
POINTS: 0 / 1

-  _____ **88** As a result of diffusion, the concentration of many types of substances
 a always remains greater inside a membrane.
 b eventually becomes balanced on both sides of a membrane.
 c always remains greater outside of a membrane.
 d becomes imbalanced on both sides of a membrane.

ANSWER: B
POINTS: 0 / 1


-  _____ **89** Diffusion is the movement of a substance
 a only through a lipid bilayer membrane.
 b from an area of low concentration to an area of higher concentration.
 c only in liquids.
 d from an area of high concentration to an area of lower concentration.

ANSWER: D
POINTS: 0 / 1

-  _____ **90** The dispersal of ink in a beaker of water is an example of
 a diffusion. c active transport.
 b osmosis. d endocytosis.


ANSWER: A

POINTS: 0 / 1

-  — **91** Sugar molecules cross the cell membrane by
- a active transport.
 - b facilitated diffusion.


- c osmosis.
- d simple diffusion.

ANSWER: B**POINTS:** 0 / 1

-  — **92** Ions move through ion channels by
- a endocytosis.
 - b simple diffusion.


- c passive transport.
- d active transport.

ANSWER: C**POINTS:** 0 / 1


-  — **93** Osmosis is a type of
- a active transport.
 - b passive transport.

- c simple diffusion.
- d endocytosis.


ANSWER: B**POINTS:** 0 / 1

-  — **94** How does water pass through the cell membrane?
- a directly through the lipid bilayer
 - b through a water ion pump
 - c through water carrier proteins
 - d through channel proteins just for water

ANSWER: D**POINTS:** 0 / 1


-  — **95** Unlike passive transport, active transport
- a requires energy.
 - b moves substances down their concentration gradient.
 - c does not involve carrier proteins.
 - d moves water across the cell membrane.

ANSWER: A**POINTS:** 0 / 1


-  — **96** Which of the following is a form of active transport?
- a osmosis
 - b simple diffusion

- c facilitated diffusion
- d sodium-potassium pump

ANSWER: D**POINTS:** 0 / 1


-  — **97** The sodium-potassium pump usually pumps
- a potassium ions out of the cell.
 - b sodium ions into the cell.
 - c potassium ions into the cell.
 - d only potassium ions and sugar molecules.

ANSWER: C**POINTS:** 0 / 1

-  _____ **98** Proteins and polysaccharides that are too large to move into a cell through diffusion or active transport move in by
- a exocytosis.
 - b endocytosis.
 - c the sodium-potassium pump.
 - d channel proteins.


ANSWER: B

POINTS: 0 / 1

-  _____ **99** Which of the following descriptions of hormones is correct?
- a signal molecules distributed throughout the body
 - b signal molecules that affect all cells in the body
 - c target molecules that communicate through direct contact
 - d target molecules that originate outside the body


ANSWER: A

POINTS: 0 / 1

-  _____ **100** Which of the following transmit information into a cell by binding to signal molecules?
- a channel proteins
 - b receptor proteins
 - c marker proteins
 - d signal proteins


ANSWER: B

POINTS: 0 / 1

-  _____ **101** Organisms that are *not* autotrophs
- a get energy from inorganic molecules.
 - b can survive without energy.
 - c must consume other organisms to get energy.
 - d get energy from sunlight.


ANSWER: C

POINTS: 0 / 1

-  _____ **102** Which of the following organisms do *not* carry out photosynthesis?
- a plants
 - b algae
 - c certain prokaryotes
 - d animals


ANSWER: D

POINTS: 0 / 1

-  _____ **103** The carbon cycle makes carbon compounds continuously available in an ecosystem and delivers
- a light energy to autotrophs.
 - b water to all organisms.
 - c carbon dioxide to animals within the ecosystem.
 - d chemical energy to organisms within the ecosystem.

ANSWER: D

POINTS: 0 / 1

-  _____ **104** Which of the following statements about glucose is correct?
- a Glucose is a less stable carbon compound than carbon dioxide is.
 - b Glucose is a more stable carbon compound than carbon dioxide is.
 - c Glucose is produced during cellular respiration.
 - d Glucose is *not* a carbon compound.

ANSWER: A

POINTS: 0 / 1

- 105** ATP is composed of a nitrogenous base, a sugar, and
- a one phosphate group.
 - b two phosphate groups.
 - c three phosphate groups.
 - d four phosphate groups.

ANSWER: C

POINTS: 0 / 1

- 106** When cells break down food molecules, energy is
- a released quickly.
 - b released entirely as body heat into the environment.
 - c stored temporarily in ATP molecules.
 - d stored permanently in ATP molecules.

ANSWER: C

POINTS: 0 / 1

- 107** ATP is called a cell's energy "currency" because
- a ATP catalyzes all metabolic reactions.
 - b ATP allows one organelle to be exchanged for another between cells.
 - c glucose is made of ATP.
 - d ATP can be "made" in one place and "spent" or used in another.

ANSWER: D

POINTS: 0 / 1

- 108** When a phosphate group is removed from an ATP molecule,
- a a substantial amount of energy is released.
 - b an enzyme is formed.
 - c energy is stored.
 - d a substantial amount of energy is used.

ANSWER: A

POINTS: 0 / 1

- 109** An enzyme that catalyzes the synthesis of ATP is
- a ATP synthase.
 - b ADP synthase.
 - c glucose synthase.
 - d phosphate synthase.

ANSWER: A

POINTS: 0 / 1

- 110** The space inside the inner membrane of a chloroplast is called the
- a thylakoid.
 - b reaction center.
 - c pigment.
 - d stroma.

ANSWER: D

POINTS: 0 / 1

- 111** Chlorophyll is green because
- a it absorbs green wavelengths of light.
 - b it absorbs blue and yellow wavelengths, which make green.
 - c it reflects green wavelengths of light.
 - d of an optical illusion caused by transmitted light.

ANSWER: C

POINTS: 0 / 1

- 112** The major atmospheric by-product of photosynthesis is
- | | |
|-------------------|-----------|
| a nitrogen. | c water. |
| b carbon dioxide. | d oxygen. |

ANSWER: D**POINTS:** 0 / 1

- 113** Because of photosynthesis,
- | |
|---|
| a the atmosphere is rich in oxygen gas. |
| b animals can get energy directly from the sun. |
| c plants produce carbon dioxide. |
| d water is constantly being produced. |

ANSWER: A**POINTS:** 0 / 1

- 114** The source of oxygen produced during photosynthesis is
- | | |
|-------------------|------------|
| a carbon dioxide. | c the air. |
| b water. | d glucose. |

ANSWER: B**POINTS:** 0 / 1

- 115** At a hydrogen ion pump of the thylakoid membrane,
- | |
|--|
| a electrons are accepted by glucose. |
| b electrons are pushed out of the thylakoid. |
| c energy from electrons is used to make ATP. |
| d the thylakoid bursts, releasing energy. |

ANSWER: C**POINTS:** 0 / 1

- 116** The energy used in the Calvin cycle for the production of sugar molecules comes from
- | | |
|--------------------|-------------------|
| a ATP only. | c ATP and NADPH. |
| b the Krebs cycle. | d carbon dioxide. |

ANSWER: C**POINTS:** 0 / 1

- 117** Carbon dioxide is converted into organic compounds in the
- | | |
|---------------------|---------------------------------|
| a the Calvin cycle. | c the electron transport chain. |
| b the Krebs cycle. | d mitochondria. |

ANSWER: A**POINTS:** 0 / 1

- 118** When glycolysis occurs,
- | | |
|------------------------------------|---------------------------|
| a a molecule of glucose is split. | c photosynthesis begins. |
| b a molecule of glucose is formed. | d pyruvates are combined. |


ANSWER: A**POINTS:** 0 / 1

- 119** What is the net gain of ATP molecules in glycolysis?
- | | |
|-----|-----|
| a 1 | c 6 |
|-----|-----|


b 2

d 34


ANSWER: B**POINTS: 0 / 1**

-  ___ **120** Cellular respiration takes place in two stages:
- a glycolysis, then photosynthesis.
 - b electron transport chain, then fermentation.
 - c glycolysis, then aerobic respiration.
 - d fermentation, then glycolysis


ANSWER: C**POINTS: 0 / 1**

-  ___ **121** Which of the following is *not* part of cellular respiration?
- a electron transport
 - b glycolysis
 - c Krebs cycle
 - d Calvin cycle


ANSWER: D**POINTS: 0 / 1**

-  ___ **122** Which of the following is *not* formed during the Krebs cycle?
- a CO₂
 - b FADH₂
 - c NADH
 - d NADPH


ANSWER: D**POINTS: 0 / 1**

-  ___ **123** The total amount of ATP that a cell gains for each glucose molecule depends on the presence of
- a water.
 - b carbon dioxide.
 - c oxygen.
 - d glucose.


ANSWER: C**POINTS: 0 / 1**

-  ___ **124** Which of the following processes produces the most ATP?
- a aerobic respiration
 - b glycolysis
 - c lactic acid fermentation
 - d alcoholic fermentation


ANSWER: A**POINTS: 0 / 1**

-  ___ **125** When a chromosome condenses,
- a a histone wraps around chromatin.
 - b beads form on the DNA double helix.
 - c its centromere splits.
 - d looped domains coil into a structure.


ANSWER: D**POINTS: 0 / 1**

-  ___ **126** In order to fit within a cell, DNA becomes more compact by
- a breaking apart into separate genes.
 - b extending to form very long, thin molecules.
 - c wrapping tightly around histones.
 - d being enzymatically changed into a protein.


ANSWER: C**POINTS: 0 / 1**

-  _____ **127** In a bacterium, cell division takes place when
- a its nucleus divides.
 - b the cell splits into two cells, one of which receives all of the DNA.
 - c the DNA is copied, a new cell wall forms between the DNA copies, and the cell splits into two cells.
 - d spindle fibers form.


ANSWER: C**POINTS: 0 / 1**

-  _____ **128** What occurs after cytokinesis is completed?
- a The cell organizes its microtubules.
 - b The cell begins to replicate its DNA.
 - c The cell enters G_1 .
 - d The cell enters G_2 .


ANSWER: C**POINTS: 0 / 1**

-  _____ **129** Which of the following shows the correct sequence of the cell cycle?
- a cytokinesis \rightarrow mitosis $\rightarrow G_1 \rightarrow S \rightarrow G_2$
 - b $S \rightarrow G_1 \rightarrow G_2 \rightarrow$ mitosis \rightarrow cytokinesis
 - c $G_1 \rightarrow S \rightarrow G_2 \rightarrow$ mitosis \rightarrow cytokinesis
 - d mitosis $\rightarrow G_1 \rightarrow S \rightarrow G_2 \rightarrow$ cytokinesis


ANSWER: C**POINTS: 0 / 1**

-  _____ **130** Cells that are not dividing remain in the
- a mitosis phase.
 - b synthesis phase.
 - c first gap phase.
 - d second gap phase.


ANSWER: C**POINTS: 0 / 1**

-  _____ **131** The synthesis (S) phase is characterized by
- a DNA replication.
 - b cell division.
 - c replication of mitochondria and other organelles.
 - d the division of cytoplasm.

ANSWER: A**POINTS: 0 / 1**

-  _____ **132** The first three phases of the cell cycle are collectively known as
- a a gap.
 - b telophase.
 - c mitosis.
 - d interphase.

ANSWER: D**POINTS: 0 / 1**

-  _____ **133** A spindle fiber is a specialized form of
- a microtubule.
 - c centriole.

b centrosome.

d chromosome.

ANSWER: A**POINTS: 0 / 1**

- 134 Refer to the illustration above. The cell in diagram 1 is in
- | | |
|--------------|-------------|
| a metaphase. | c anaphase. |
| b telophase. | d prophase. |

ANSWER: C**POINTS: 0 / 1**

- 135 Refer to the illustration above. Mitosis begins with the stage shown in diagram
- | | |
|------|------|
| a 1. | c 3. |
| b 2. | d 4. |

ANSWER: B**POINTS: 0 / 1**

- 136 Refer to the illustration above. The cell shown in diagram 5 is in
- | | |
|--------------|-------------|
| a metaphase. | c anaphase. |
| b telophase. | d prophase. |

ANSWER: B**POINTS: 0 / 1**

- 137 As a result of mitosis, each of the two new cells produced from the parent cell during cytokinesis
- | |
|---|
| a receives a few chromosomes from the parent cell. |
| b receives an exact copy of all the chromosomes present in the parent cell. |
| c donates a chromosome to the parent cell. |
| d receives exactly half the chromosomes from the parent cell. |


ANSWER: B**POINTS: 0 / 1**

- 138 Cytokinesis in plant cells involves the formation of
- | | |
|------------------------------|-------------------|
| a a belt of protein threads. | c spindle fibers. |
| b a cell plate. | d centrioles. |


ANSWER: B**POINTS: 0 / 1**

- 139 Which of the following statements is true?
- | |
|---|
| a Prokaryotes divide by mitosis. |
| b Eukaryotes have circular chromosomes. |
| c Animal cells form new cell walls when they divide. |
| d Plant cells and animal cells have different strategies for cytokinesis. |


ANSWER: D**POINTS: 0 / 1**

-  _____ **140** In eukaryotes, the cell cycle is controlled by
- a proteins.
 - b carbohydrates.
 - c lipids.
 - d fats.


ANSWER: A**POINTS: 0 / 1**

-  _____ **141** At the G₂ checkpoint, DNA replication is checked by
- a receptor proteins.
 - b electron transport chains.
 - c repair enzymes.
 - d cell-surface markers.


ANSWER: C**POINTS: 0 / 1**

-  _____ **142** The cell cycle is monitored as each cell passes through
- a the S phase.
 - b checkpoints.
 - c the interphase checkpoint.
 - d cytokinesis.


ANSWER: B**POINTS: 0 / 1**

-  _____ **143** Normal cells become cancer cells when
- a regulation of cell growth and division occurs.
 - b cells respond to control mechanisms.
 - c cells pass through G₁.
 - d cells do not respond to checkpoints.


ANSWER: D**POINTS: 0 / 1**

-  _____ **144** The simplest and most primitive method of reproduction is
- a sexual.
 - b diploid.
 - c haploid.
 - d asexual.

ANSWER: D**POINTS: 0 / 1**

-  _____ **145** In humans, gametes contain
- a 22 autosomes and 1 sex chromosome.
 - b 1 autosome and 22 sex chromosomes.
 - c 45 autosomes and 1 sex chromosome.
 - d 1 autosome and 45 sex chromosomes.

ANSWER: A**POINTS: 0 / 1**

-  _____ **146** In humans, the male determines the sex of the child because males have
- a two X chromosomes.
 - b one X and one Y chromosome.
 - c two Y chromosomes.
 - d 46 chromosomes.

ANSWER: B**POINTS: 0 / 1**

- 147** How many chromosomes are in the body cells of an organism that has a haploid number of 8?

- a 4
 b 8
 c 12
 d 16

ANSWER: D
POINTS: 0 / 1

- 148 The diploid number of chromosomes in a human skin cell is 46. The number of chromosomes found in a human egg cell is
 a 46.
 b 92.
 c 23.
 d 12.5.

ANSWER: C
POINTS: 0 / 1

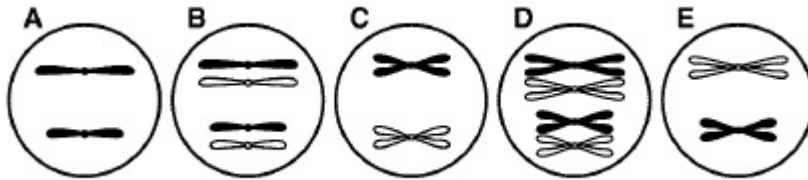
- 149 Separation of homologues occurs during
 a mitosis.
 b meiosis I.
 c meiosis II.
 d fertilization.

ANSWER: B
POINTS: 0 / 1

- 150 When crossing-over takes place, chromosomes
 a mutate in the first division.
 b produce new genes.
 c decrease in number.
 d exchange corresponding segments of DNA.

ANSWER: D
POINTS: 0 / 1

Using the information you have learned about cell reproduction, infer answers to the questions below about a cell with a diploid number of 4 chromosomes. Select from among the diagrams below, labeled A, B, C, D, and E, to answer the questions.




- 151 Which of the diagrams above depicts a cell at the beginning of mitosis?
 a B
 b C
 c D
 d E

ANSWER: C
POINTS: 0 / 1


- 152 The exchange of segments of DNA between the members of a pair of chromosomes
 a ensures that variations within a species never occur.
 b acts as a source of variations within a species.
 c always produces genetic disorders.
 d is called genetic crossing.

ANSWER: B
POINTS: 0 / 1

-  ___ **153** Crossing-over occurs
- | | |
|-------------------------|----------------------|
| a during prophase II. | c during prophase I. |
| b during fertilization. | d at the centromere. |


ANSWER: C

POINTS: 0 / 1

-  ___ **154** To create new haploid cells during the haploid life cycle, the zygote undergoes
- | | |
|------------------|------------|
| a mitosis. | c fusion. |
| b fertilization. | d meiosis. |


ANSWER: D

POINTS: 0 / 1

-  ___ **155** In alternation of generations, a diploid spore-forming cell gives rise to four
- | | |
|----------------|-------------------|
| a zygotes. | c haploid spores. |
| b sperm cells. | d diploid spores. |


ANSWER: C

POINTS: 0 / 1

-  ___ **156** Avery's experiments showed that transformation
- | |
|---|
| a is prevented by protein-destroying enzymes. |
| b is prevented by DNA-destroying enzymes. |
| c causes protein to become DNA. |
| d is caused by a protein. |


ANSWER: B

POINTS: 0 / 1

-  ___ **157** Using radioactive tracers to determine the interactions of bacteriophages and their host bacteria, Hershey and Chase demonstrated without question that
- | |
|---|
| a genes are composed of protein molecules. |
| b DNA and proteins are actually the same molecules located in different parts of cells. |
| c bacteria inject their DNA into the cytoplasm of bacteriophages. |
| d DNA is the molecule that stores genetic information in cells. |


ANSWER: D

POINTS: 0 / 1

-  ___ **158** All of the following are true of the viruses Hershey and Chase used in their study *except*
- | |
|---|
| a they consisted of DNA surrounded by a protein coat. |
| b they injected their DNA into cells. |
| c they destroyed the DNA of the infected bacteria. |
| d they caused infected bacteria to make many new viruses. |

ANSWER: C

POINTS: 0 / 1

-  ___ **159** Molecules of DNA are composed of long chains of
- | | |
|----------------|--------------------|
| a amino acids. | c monosaccharides. |
| b fatty acids. | d nucleotides. |

ANSWER: D

POINTS: 0 / 1

160 Which of the following is *not* part of a molecule of DNA?

- a deoxyribose
 b nitrogen base
 c phosphate
 d ribose

ANSWER: D
POINTS: 0 / 1

- 161 A nucleotide consists of
 a a sugar, a protein, and adenine.
 b a sugar, an amino acid, and starch.
 c a sugar, a phosphate group, and a nitrogen base.
 d a starch, a phosphate group, and a nitrogen base.

ANSWER: C
POINTS: 0 / 1

- 162 Of the four nitrogen bases in DNA, which two are purines and which two are pyrimidines?
 a purines: adenine, thymine; pyrimidines: uracil, cytosine
 b purines: adenine, thymine; pyrimidines: guanine, cytosine
 c purines: adenine, guanine; pyrimidines: thymine, cytosine
 d purines: uracil, thymine; pyrimidines: guanine, cytosine

ANSWER: C
POINTS: 0 / 1

- 163 The amount of guanine in an organism always equals the amount of
 a protein.
 b thymine.
 c adenine.
 d cytosine.

ANSWER: D
POINTS: 0 / 1

- 164 RNA differs from DNA in that RNA
 a is double-stranded.
 b contains deoxyribose.
 c contains the nitrogen base uracil.
 d does not contain adenine.

ANSWER: C
POINTS: 0 / 1

- 165 Which of the following is *not* found in RNA?
 a adenine
 b cytosine
 c thymine
 d uracil

ANSWER: C
POINTS: 0 / 1


- 166 RNA is chemically similar to DNA except that the sugar in RNA has an additional
 a oxygen atom.
 b phosphate group.
 c nitrogen base.
 d carbon atom.

ANSWER: A
POINTS: 0 / 1

- 167 In RNA molecules, adenine is complementary to
 a cytosine.
 b guanine.
 c thymine.
 d uracil.


ANSWER: D

POINTS: 0 / 1

-  168 Each of the following is a type of RNA *except*
- a carrier RNA.
 - b messenger RNA.
 - c ribosomal RNA.
 - d transfer RNA.


ANSWER: A

POINTS: 0 / 1

-  169 During transcription, the genetic information for making a protein is “rewritten” as a molecule of
- a messenger RNA.
 - b ribosomal RNA.
 - c transfer RNA.
 - d translation RNA.

ANSWER: A

POINTS: 0 / 1

-  170 Transcription begins when RNA polymerase
- a attaches to a ribosome.
 - b unwinds a strand of DNA.
 - c binds to a strand of RNA.
 - d attaches to the promoter sequence of a gene.


ANSWER: D

POINTS: 0 / 1

-  171 The function of rRNA is to
- a synthesize DNA.
 - b synthesize mRNA.
 - c form ribosomes.
 - d transfer amino acids to ribosomes.


ANSWER: C

POINTS: 0 / 1

-  172 At the very beginning of translation, the first tRNA molecule
- a binds to the mRNA’s anticodon.
 - b attaches directly to the DNA codon.
 - c connects an amino acid to its anticodon.
 - d binds to the mRNA’s start codon.


ANSWER: D

POINTS: 0 / 1

-  173 Transfer RNA
- a carries an amino acid to its correct codon.
 - b synthesizes amino acids as they are needed.
 - c produces codons to match the correct anticodons.
 - d converts DNA into mRNA.

ANSWER: A

POINTS: 0 / 1

-  174 Which of the following does *not* affect the final outcome of gene expression?
- a the environment of the cells
 - b the number of amino acids in the protein being produced
 - c the presence of other cells
 - d the timing of gene expression

ANSWER: B

POINTS: 0 / 1

- 175 The chromosomes of bacteria
- contain numerous types of organelles.
 - are divided into compartments.
 - vary in number, depending on the species of bacteria.
 - contain a single circular piece of DNA.

ANSWER: D

POINTS: 0 / 1

- 176 Structures found in bacterial cells but *not* in eukaryotic cells are
- nuclei.
 - linear chromosomes.
 - membrane-bound organelles.
 - circular chromosomes.

ANSWER: D

POINTS: 0 / 1



- 177 Refer to the illustration above. The shape represented by Organism A applies to the bacterial genus
- Streptococcus*, which causes strep throat.
 - Leptospira*, which can cause urinary tract infections in humans.
 - Bacillus*, which produces antibiotics.
 - Penicillium*, which produces penicillin.

ANSWER: A

POINTS: 0 / 1

- 178 Refer to the illustration above. The shape represented by Organism C is called
- a coccus.
 - a spirillum.
 - a bacillus.
 - filamentous.

ANSWER: B

POINTS: 0 / 1

- 179 Cell organelles that *Escherichia coli* and other bacteria have in common with eukaryotes are
- chloroplasts.
 - mitochondria.
 - nuclei.
 - ribosomes.


ANSWER: D

POINTS: 0 / 1

- 180 It is important to distinguish between Gram-positive and Gram-negative bacteria in diagnosing a bacterial infection because
- Gram-negative and Gram-positive bacteria differ in their response to different antibiotics.
 - Gram-positive bacteria never cause fatal diseases.
 - Gram-positive bacteria destroy antibiotics, preventing them from working.
 - Gram-positive bacteria do not respond to many antibiotics.


ANSWER: A

POINTS: 0 / 1

-  _____ **181** One difference between the cells in a human body and bacterial cells is that bacterial cells have
- a an outer cell wall made up of lipids.
 - b an outer cell wall made up of carbohydrates and proteins.
 - c no DNA.
 - d no ribosomes.


ANSWER: B

POINTS: 0 / 1

-  _____ **182** Bacterial cells have
- a a cell wall only.
 - b a cell membrane only.
 - c both a cell membrane and an outer cell wall.
 - d a cell wall inside their cell membrane.


ANSWER: C

POINTS: 0 / 1

-  _____ **183** *Escherichia coli* is an example of a bacterium that has
- a a thin layer of peptidoglycan in its cell wall.
 - b a thick layer of peptidoglycan in its cell wall.
 - c a shape called a coccus.
 - d a cell wall but no cell membrane.


ANSWER: A

POINTS: 0 / 1

-  _____ **184** Cyanobacteria are photoautotrophs because they require
- a oxygen.
 - b carbon dioxide.
 - c inorganic chemicals.
 - d light.


ANSWER: D

POINTS: 0 / 1

-  _____ **185** Nitrogen-fixing bacteria
- a repair nitrogen-damaged soybean roots.
 - b damage the environment by using atmospheric oxygen to produce toxic nitrogen compounds.
 - c convert atmospheric nitrogen into a usable form of nitrogen.
 - d convert ammonia in the soil into nitrogen gas.


ANSWER: C

POINTS: 0 / 1

-  _____ **186** Bacteria that cause botulism may survive in canned food for a long time because
- a the can was left open.
 - b some cans may contain viruses that protect the bacteria.
 - c the bacteria may form endospores.
 - d sterilized cans do not have enough oxygen to harm the bacteria.

ANSWER: C


POINTS: 0 / 1

-  _____ **187** Bacterial endospores
- a are formed when there is plenty of available food.
 - b allow certain species to survive harsh environmental conditions.
 - c are similar to human tumors.

d can cause growth abnormalities in plants.


ANSWER: B

POINTS: 0 / 1

-  **188** We know viruses are not alive because they
- a are made of cells.
 - b make prions rather than proteins.
 - c they are autotrophic.
 - d they are not made of cells.


ANSWER: D

POINTS: 0 / 1

-  **189** A typical virus consists of a
- a protein coat and a cytoplasm core.
 - b carbohydrate coat and a nucleic acid core.
 - c protein coat and a nucleic acid core.
 - d polysaccharide coat and a nucleic acid core.


ANSWER: C

POINTS: 0 / 1

-  **190** Biologists now know that viruses
- a are the smallest organisms.
 - b consist of a protein surrounded by a nucleic acid coat.
 - c contain RNA or DNA in a protein coat.
 - d all form the same crystalline shape.


ANSWER: C

POINTS: 0 / 1

-  **191** The function of a bacteriophage's tail and tail fibers is to inject
- a viral protein into the host cell.
 - b viral enzymes into the host cell.
 - c glycoproteins into the host cell.
 - d viral DNA into the host cell.


ANSWER: D

POINTS: 0 / 1

-  **192** A provirus is part of a virus's
- a lytic cycle.
 - b conjugation cycle.
 - c infection cycle.
 - d lysogenic cycle.


ANSWER: D

POINTS: 0 / 1


-  **193** In a lytic cycle, viral genetic material
- a remains separate from the host cell's DNA.
 - b becomes part of the host cell's DNA.
 - c becomes a provirus.
 - d remains in the host cell permanently.

ANSWER: A


POINTS: 0 / 1

-  **194** Viroids are
- a much smaller than viruses.
 - b much larger than viruses.
 - c misshapen proteins.
 - d found in the brain.


ANSWER: A
POINTS: 0 / 1

-  — **195** Prions
- a always have a capsid.
 - b cause abnormal growth in plants.
 - c change the shape of normal proteins.
 - d are made of RNA.


ANSWER: C
POINTS: 0 / 1

-  — **196** Which of the following is *not* one of Koch's postulates?
- a When the isolated pathogen is injected into a healthy animal, the animal must develop the disease.
 - b The pathogen must be found in an animal with the disease and not in a healthy animal.
 - c The healthy animal must be shown to be susceptible to the pathogen before it is injected with the disease.
 - d The pathogen must be isolated from a sick animal and grown in a laboratory culture.


ANSWER: C
POINTS: 0 / 1

-  — **197** A bacterial disease caused by bacteria that use human tissue for nutrients is
- a tuberculosis.
 - b food poisoning.
 - c measles.
 - d hepatitis B.


ANSWER: A
POINTS: 0 / 1

-  — **198** Antibiotic resistance
- a arises by mutation in an infected person.
 - b may prevent bacteria from making new cell walls.
 - c can be prevented by widespread use of antibiotics.
 - d arises naturally in bacteria.

ANSWER: D
POINTS: 0 / 1

-  — **199** Antibiotics are ineffective against viral infections because
- a viruses are protected inside their host cells.
 - b viruses have enzymes that inactivate the antibiotics.
 - c antibiotics interfere with metabolic processes that viruses do not perform.
 - d viral protein coats block the antibiotics from entering the virus.

ANSWER: C
POINTS: 0 / 1

-  — **200** An emerging disease that might mutate, spreading to humans as a new host, is
- a tuberculosis.
 - b SARS.
 - c hanta virus.
 - d bird flu.

ANSWER: D
POINTS: 0 / 1