

Quarter 2 Mastery Packet

Name: _____

*** This is a practice test only and is not all inclusive of all material that will be on the final exam. Do not rely solely on this mastery packet for your review, because it doesn't include everything that may potentially be tested. These questions are related to second quarter material only. Use your first quarter mastery packet as review of first quarter material.

- 1) "Sticky ends" are produced as a result of the action of _____.
 - A) DNA ligase
 - B) a clone
 - C) humulin
 - D) a restriction enzyme
 - E) genomics

- 2) "Sticky ends" are _____.
 - A) single-stranded ends of fragments of double-stranded DNA
 - B) the only regions of chromosomes where homeotic genes are found
 - C) the site on chromosomes where the centromere is found
 - D) telomeres
 - E) regions of double-stranded DNA that can be cut by a restriction enzyme

- 3) Cutting DNA with a particular restriction enzyme produces _____ that can be separated by gel electrophoresis.
 - A) enzymes
 - B) restriction fragments
 - C) recombinant DNA
 - D) a genomic library
 - E) plasmids

- 4) Restriction enzymes are obtained from _____.
 - A) retroviruses
 - B) eukaryotes
 - C) DNA viruses
 - D) archaea
 - E) bacteria

- 5) Gel electrophoresis separates DNA molecules on the basis of _____.
 - A) the amount of adenine they contain relative to the amount of thymine they contain
 - B) the nucleotide sequence of their sticky ends
 - C) the amount of adenine they contain relative to the amount of guanine they contain
 - D) their lengths
 - E) their nucleotide sequences

- 6) DNA and RNA are polymers composed of _____ monomers.
 - A) amino acid
 - B) nucleic acid
 - C) carbohydrate
 - D) fatty acid
 - E) nucleotide

- 7) The backbone of DNA consists of _____.
 - A) a repeating ACTGACTG pattern
 - B) nitrogenous bases
 - C) a repeating sugar-nucleotide-sugar-nucleotide pattern
 - D) a repeating sugar-phosphate-sugar-phosphate pattern
 - E) paired nucleotides

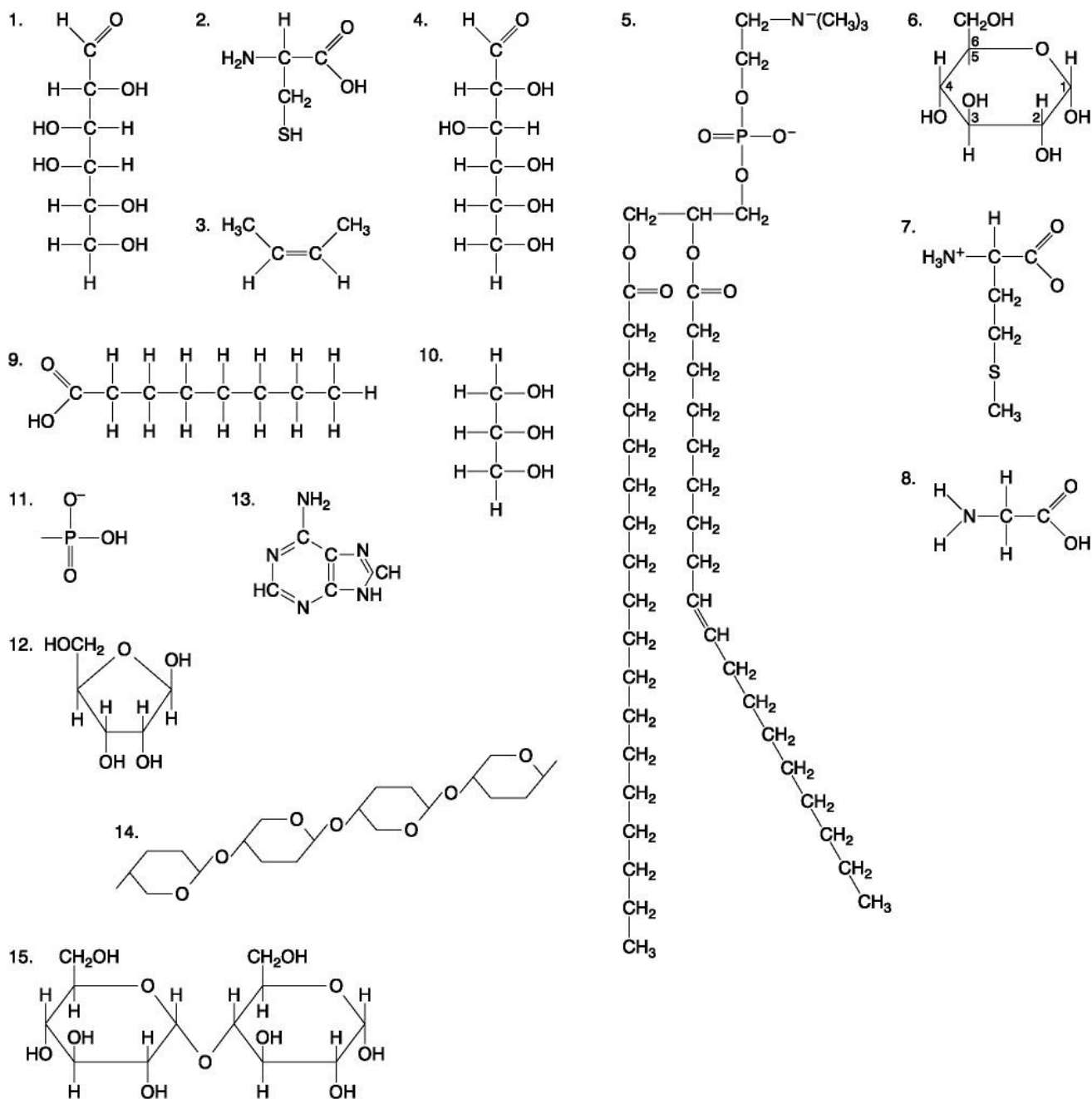
- 8) In a DNA double helix, adenine pairs with _____ and guanine pairs with _____.
 - A) guanine . . . adenine
 - B) cytosine . . . uracil
 - C) uracil . . . cytosine
 - D) thymine . . . cytosine
 - E) cytosine . . . thymine

- 9) The percent of cytosine in a double stranded DNA is 17. What is the percent of adenine in that DNA?
 - A) 17
 - B) 66
 - C) 33
 - D) 34

- 10) Who discovered the structure of DNA?
A) Chase
B) Watson and Crick
C) Hershey and Chase
D) Franklin
E) Pauling
- 11) The two strands of a DNA molecule run in opposite directions. The 3' and 5' ends of one strand are opposite the 5' and 3' ends of the complementary strand. This is analogous to
A) a baseball and a bat.
B) a photograph and a photographic negative.
C) an "up" escalator next to a "down" escalator.
D) one side of a divided highway.
E) both A and C.
- 12) In order to fit within a cell, DNA becomes more compact by
A) being enzymatically changed into a protein. B) extending to form very long, thin molecules.
C) wrapping tightly around associated proteins. D) breaking apart into separate genes.
- 13) Which of the following is characteristic of a DNA double helix?
A) The amount of adenine is equal to the amount of thymine, and the amount of guanine is equal to the amount of uracil.
B) The amount of adenine is equal to the amount of cytosine, and the amount of guanine is equal to the amount of thymine.
C) The amount of adenine is equal to the amount of guanine, and the amount of thymine is equal to the amount of cytosine.
D) The amount of adenine is equal to the amount of uracil, and the amount of guanine is equal to the amount of cytosine.
E) The amount of adenine is equal to the amount of thymine, and the amount of guanine is equal to the amount of cytosine.
- 14) Which of the following is an example of a hydrophobic material?
A) paper B) sugar C) table salt D) pasta E) wax
- 15) Which type of lipid is most important in biological membranes?
A) triglyceride B) wax C) oil D) phospholipid E) fat
- 16) Cell division which occurs in bacteria is called
A) cloning B) binary fission C) mitosis D) cytokinesis
- 17) Which of the following best summarizes the relationship between dehydration reactions and hydrolysis?
A) Dehydration reactions assemble polymers, and hydrolysis breaks them down.
B) Dehydration reactions can occur only after hydrolysis.
C) Dehydration reactions occur in plants, and hydrolysis happens in animals.
D) Hydrolysis occurs during the day, and dehydration reactions happen at night.
E) Hydrolysis creates monomers, and dehydration reactions destroy them.
- 18) Which of the following is *true* concerning saturated fatty acids?
A) They are the predominant fatty acid in corn oil.
B) They have double bonds between the carbon atoms of the fatty acids.
C) They are usually produced by plants.
D) They have a higher ratio of hydrogen to carbon than do unsaturated fatty acids.
E) They are usually liquid at room temperature.

- 25) Which of the following statements concerning *unsaturated* fats is correct?
- They have fewer fatty acid molecules per fat molecule.
 - They are more common in animals than in plants.
 - They generally solidify at room temperature.
 - They contain more hydrogen than saturated fats having the same number of carbon atoms.
 - They have double bonds in the carbon chains of their fatty acids.
- 26) The statement that “DNA replication is semi-conservative” means that
- The two strands of the double helix have identical base sequences
 - Only one strand of DNA is copied
 - First one strand is copied, and then the other strand is copied
 - Each double helix consists of one old and one new DNA strand
- 27) Why must the lagging strand of DNA be replicated in short pieces?
- the DNA polymerase can synthesize in only one direction
 - to make proofreading for errors easier
 - otherwise the helix will become distorted
 - because of limited space
- 28) Which enzymes catalyze the elongation of a DNA strand in the $5' \rightarrow 3'$ direction?
- DNA polymerase I
 - DNA polymerase III
 - DNA ligase
 - helicase
 - primase
- 29) The problem of replicating the lagging strand of DNA—that is, adding bases in the $3' \rightarrow 5'$ direction—requires which of the following?
- RNA primers
 - DNA ligase
 - Okazaki fragments
 - A and B only
 - A, B, and C
- 30) In DNA replication the fragments of newly synthesized DNA are joined together, so that the 5' end of one fragment is joined to the 3' end of another fragment by the action of
- | | |
|-------------------|----------------------|
| A) DNA polymerase | B) DNA ligase |
| C) RNA primer | D) DNA endonucleases |
- 31) The polymerase chain reaction is important because it allows us to
- make many copies of a targeted segment of DNA.
 - incorporate genes into viruses.
 - insert regulatory sequences into eukaryotic genes.
 - insert eukaryotic genes into prokaryotic plasmids.
 - make DNA from RNA transcripts.
- 32) What type of chemical bond joins the bases of complementary DNA strands?
- | | | | | |
|----------|----------------|-------------|-------------|----------------|
| A) ionic | B) hydrophilic | C) hydrogen | D) covalent | E) hydrophobic |
|----------|----------------|-------------|-------------|----------------|
- 33) Bacteria use restriction enzymes to _____.
- | | |
|----------------------------|-------------------|
| A) destroy foreign DNA | B) synthesize RNA |
| C) destroy foreign protein | D) synthesize DNA |

The following questions are based on the 15 molecules illustrated below. Each molecule may be used once, more than once, or not at all.



34) Which of the following molecules is a saturated fatty acid?

- A) 10 B) 7 C) 5 D) 9 E) 14

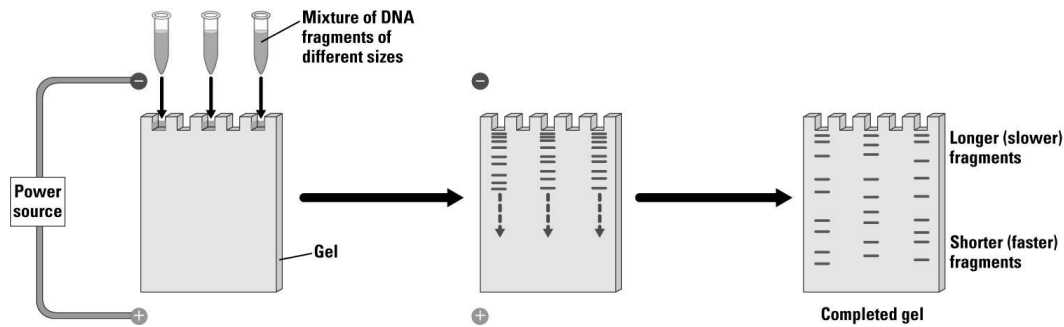
35) Whiplike structures used by bacteria for movement are called

- A) flagella B) pili C) spheres D) spirilla

36) Gel electrophoresis separates DNA molecules on the basis of

- A) their lengths.
 B) their nucleotide sequences.
 C) the amount of adenine they contain relative to the amount of thymine they contain.
 D) the amount of adenine they contain relative to the amount of guanine they contain.
 E) the nucleotide sequence of their sticky ends.

37) The following figure shows that gel electrophoresis can be used to separate repetitive DNA sequences. Gel electrophoresis separates DNA fragments because _____.



- A) double stranded moves slower than single stranded DNA
- B) of the salt concentration in the gel matrix
- C) of ratios of guanine to cytosine
- D) DNA fragments have a negative charge and move to the positive pole
- E) of the consistency of the gel

38) Individual cells of bacteria can be spheres, spirals, or

- A) cubes
- B) rods
- C) plasmids
- D) flagella

39) Of the following, which is probably the most common route for membrane flow in the endomembrane system?

- A) Golgi → lysosome → ER → plasma membrane
- B) tonoplast → plasma membrane → nuclear envelope → smooth ER
- C) rough ER → vesicles → Golgi → plasma membrane
- D) ER → chloroplasts → mitochondrion → cell membrane
- E) nuclear envelope → lysosome → Golgi → plasma membrane

40) Which of the following are characteristics of both prokaryotic and eukaryotic cells?

- A) Cell membrane, ribosomes and DNA
- B) Golgi apparatus and ribosomes
- C) Cell wall, several vesicles and cytoplasm
- D) Mitochondria and nucleus
- E) Cytoplasm and a well defined nucleus

41) Molecules done being processed in the ER are often transported to which structure?

- A) Peroxisomes
- B) Golgi apparatus
- C) Vacuoles
- D) Mitochondria

42) Ribosomes are the site of

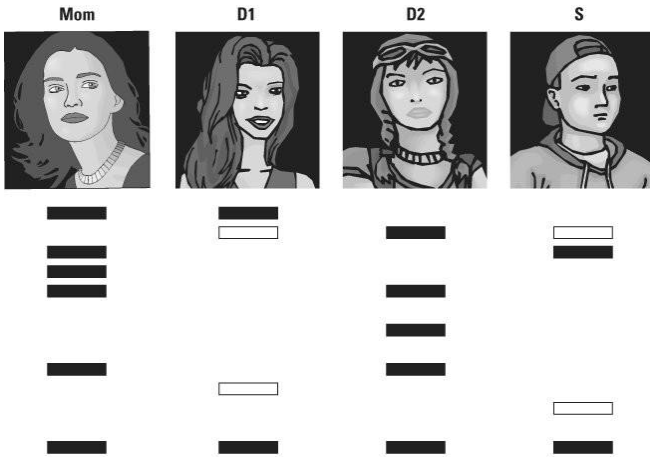
- A) cellular respiration
- B) cellulare reproduction
- C) photosynthesis
- D) protein synthesis

43) Which of the following is *not* found in a prokaryotic cell?

- A) plasma membrane
- B) endoplasmic reticulum
- C) DNA
- D) cell wall
- E) ribosomes

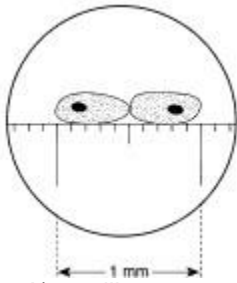
Please read the following scenario then answer the following question(s).

Molecular biologists have perfected DNA fingerprinting so that it is possible to use the technique to provide evidence to solve crimes and even identify a child's parents. Recently, a U.S. immigrant asked the U.S. Citizenship and Immigration Services for permission to have her young daughter who was living with grandparents in their homeland join her. Her request was denied because there was an apparent mix-up with the child's birth certificate and it could not be used as proof of paternity. Proof is required in cases such as this. The mother requested DNA fingerprinting to make her case. Samples of DNA were taken from the mother (Mom) and daughter (D1) as well as from another daughter (D2) and a son (S) living in the United States with her. Tandem repeat analysis was run on the four samples, and the results are shown here.



- 44) The results indicate that _____.
- A) she is not the mother of the son
 - B) the mother could not be the mother of both daughter A and daughter B
 - C) she is the mother of daughter A
 - D) she is not the mother of daughter A
 - E) daughter A and daughter B are identical twins
- 45) You were able to make your choice because _____.
- A) both mother and daughter contain only X chromosomes
 - B) of the size of the bands
 - C) of the position of the bands in the gel
 - D) of molecular weight variations
 - E) the shade of DNA bands will differ
- 46) Of the following organelles, which group is involved in manufacturing substances needed by the cell?
- A) lysosome, vacuole, ribosome
 - B) rough ER, lysosome, vacuole
 - C) smooth ER, ribosome, vacuole
 - D) ribosome, rough ER, smooth ER
 - E) vacuole, rough ER, smooth ER
- 47) Plant and animal cells both have
- A) Large vacuoles, cell membranes and mitochondria
 - B) Ribosomes, cell walls and mitochondria
 - C) Golgi apparatus, cell walls and ribosomes
 - D) Golgi apparatus, chromosomes and mitochondria

48) What is the average length of each cell in this field of view?



- A) 2 millimeters
- B) 500 micrometers
- C) 1 millimeter
- D) 200 micrometers
- E) 100 micrometers

49) What is the ratio of the relative size of a eukaryotic cell, a virus and a prokaryotic cell?

	Eukaryotic Cell	Virus	Prokaryotic Cell	
A.	100		1	1
B.	100		10	10
C.	100		10	1
D.	1000	1		10

- A) A
- B) B
- C) C
- D) D

50) A microscope has a field of view diameter of 2,000 microns under a total low power magnification of 100 X. This microscope has a 10X power ocular. If a cell which is observed takes up approximately 1/6 of the field of view under low power, what is its approximate length?

- A) 168 microns
- B) 1,000 microns
- C) not enough information is provided
- D) 333 microns

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

** this is a bad question **