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chem10b 12.1-5

Which of the following is not a natural polymer?

silk
starch
protein
cellulose
nylon

	Student Response	Correct Answer
A.	nylon	
B.	silk	
C.	cellulose	
D.	starch	
E.	protein	

2.

chem10b 12.1-7

There are _____ different amino acids present in most proteins.

	Student Response	Correct Answer	Feedback
A.	1		
B.	2		
C.	99		
D.	16		
E.	20		

3.

chem10b 12.4-5

A plasticizer makes a polymer more pliable by reducing the interactions between polymer chains.

Student Response

Correct Answer

4.

chem10b 12.2-25

Cholesteric liquid crystals have not been used for monitoring of _____.

Student Response

Correct Answer Feedback

- A. skin temperature
- B. temperature of cookware
- C. all of the above
- D. hot spots in microelectronic circuits
- E. temperature of light

5.

chem10b 12.2-20

In the smectic A liquid-crystalline phase, _____.

**Student Response
Feedback**

Correct Answer

- A. the molecules are oriented in a totally random fashion
- B. the molecules are aligned along their long axes, with no ordering with respect to the ends of the molecules
- C. the molecules are aligned with their long axes tilted with respect to a line perpendicular to the plane in which the molecules are stacked
- D. disk-shaped molecules are aligned through a stacking of the disks in layers
- E. the molecules are arranged in sheets, with their long axes parallel and their ends aligned as well

Score: 1/1

6.

chem10b 12.2-16

Materials that eventually break down in the body _____.

Student Response	Correct Answer	Feedback
A. can be used to construct "scaffoldings" on which natural cells grow		
B. can be used to construct bone-replacements		
C. are always toxic		
D. can be used to construct long-term replacements for heart valves		
E. cannot be used as biomaterials		

7.

chem10b 12.2-11

Natural rubber is too soft and chemically reactive for practical applications. Vulcanization of natural rubber entails _____.

Student Response	Correct Answer	Feedback
A. increasing the average molecular weight of a condensation polymer		
B. crosslinking reactive polymer chains with sulfur atoms		
C. decreasing the average molecular weight of an addition polymer		
D. conversion of a condensation polymer to an addition polymer		
E. conversion of an addition polymer to a condensation polymer		

Score: 1/1

8.

chem10b 12.2-2

The material first shown to exhibit what we now call superconductivity was _____.

Student Response	Correct Answer	Feedback
A. a thin film		

- B. a ceramic
- C. a metal
- D. a composite
- E. a polymer

9.

chem10b 12.2-23

For a given substance that exhibits liquid-crystalline properties, the transition from solid to liquid-crystal state occurs _____.

Student Response	Correct Answer	Feedback
A. at a well defined temperature below the melting point of the solid		
B. over a range of temperatures between the melting point of the solid and the boiling point of the liquid		
C. over a range of temperatures that includes the melting point of the solid		
D. at the melting point of the solid		
E. at a well defined temperature above the melting point of the solid		

1.

chem10b 12.1-7

There are _____ different amino acids present in most proteins.

Student Response	Correct Answer	Feedback
A. 1		
B. 2		
C. 99		
D. 16		
E. 20		

2.

chem10b 12.2-10

The monomer that is polymerized to make natural rubber is _____.

Student Response	Correct Answer	Feedback
A. adipic acid		
B. formaldehyde		
C. ethylene		
D. isoprene		
E. melamine		

3.

chem10b 12.2-16

Materials that eventually break down in the body _____.

Student Response	Correct Answer	Feedback
A. can be used to construct bone-replacements		
B. can be used to construct long-term replacements for heart valves		
C. can be used to construct "scaffoldings" on which natural cells grow		
D. cannot be used as biomaterials		
E. are always toxic		

Score: 1/1

4.

chem10b 12.2-15

A biomaterial intended for use as a long-term replacement of a blood vessel _____.

Student Response	Correct Answer	Feedback
A. must be rigid and chemically inert		
B. must be rigid and have rough surfaces		
C. should be designed such that it encourages coagulation of blood		
D. must be rigid and must not degrade over time		

E. must be flexible and have an open porous structure

5.

chem10b 12.1-6

A category _____ plastic container will generally be the most easily recycled.

Student Response	Correct Answer	Feedback
A. 1		
B. 2		
C. 3		
D. 4		
E. 22		

6.

chem10b 12.2-19

Which of the following is most likely to exhibit liquid-crystalline behavior?

Student Response	Correct Answer	Feedback
A. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{-Na}^+$		
B. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$		
C.		
D.		
E. $\text{CH}_3\text{CH}_2\text{-C}(\text{CH}_3)_2\text{-CH}_2\text{CH}_3$		

7.

chem10b 12.2-4

A material is sintered by _____.

Student Response	Correct Answer	Feedback
A. placing in the middle		
B. heating with sulfur		
C. sieving to achieve uniform particle size		
D. heating the finely divided solid to a high temperature under pressure		
E. finely dividing the solid		

8.

chem10b 12.2-1

Superconductivity means that _____.

Student Response	Correct Answer	Feedback
A. super expensive materials were used		
B. diamagnetic atoms become elongated		
C. electrons move through a shorter path		
D. electrons move faster		
E. electrons move without resistance		

9.

chem10b 12.2-21

Cholesteric liquid crystals are colored because _____.

Student Response	Correct Answer	Feedback
A. each molecule is a chromophore		
B. All of the molecules contain multiple benzene rings.		
C. of the large number of conjugated bonds		
D. of the slight twist between layers		

E. of the large spacing between layers

1.

chem10b 12.2-17

In the context of biopolymers, the opposite of the polymerization process is _____.

Student Response	Correct Answer	Feedback
A. sublimation		
B. hydrolysis		
C. addition		
D. cross-linking		
E. condensation		

2.

chem10b 12.2-14

A biomaterial intended for use as a long-term replacement of a bone must _____.

Student Response	Correct Answer	Feedback
A. not degrade over time		
B. possess all of these qualities		
C. not cause an immune response		
D. be chemically inert		
E. have sufficient rigidity		

3.

chem10b 12.2-5

In initial steps of the sol-gel process, a reactive metal is treated with an alcohol to form a metal alkoxide. The metal alkoxide is then combined with water to form the metal hydroxide. The metal

hydroxide is not formed directly by reaction of the metal with water because _____.

Student Response	Correct Answer	Feedback
A. the alcohol stabilizes the metal hydroxide making it less susceptible to attack by the base added later		
B. finer particles are obtained in the two-step process		
C. the two-step process prevents oxidation of the metal to an unstable oxidation state		
D. the metal hydroxide formed in the two-step process is more soluble and is more easily utilized		
E. the direct reaction of a reactive metal with water will give a complex mixture of metal oxides and hydroxide		

4.

chem10b 12.1-10

Which type of liquid crystal is colored and changes color with temperature?

Student Response	Correct Answer	Feedback
A. smectic C		
B. cholesteric		
C. smectic B		
D. nematic		
E. smectic A		

5.

chem10b 12.2-16

Materials that eventually break down in the body _____.

Student Response	Correct Answer	Feedback
A. are always toxic		
B. can be used to construct long-term replacements for heart valves		
C. cannot be used as biomaterials		
D. can be used to construct bone-replacements		
E. can be used to construct "scaffoldings" on which natural cells grow		

Score: 1/1

6.

chem10b 12.2-24

For a given substance that exhibits liquid-crystalline properties, the liquid-crystalline state exists _____.

- | Student Response | Correct Answer | Feedback |
|---|-----------------------|-----------------|
| A. in a range of temperatures above the melting point of the solid | | |
| B. in a range of temperatures below the melting point of the solid | | |
| C. at one particular temperature above the melting point of the solid | | |
| D. at one particular temperature below the melting point of the solid | | |
| E. in a range of temperatures from below the melting point to above the melting point | | |

Score: 1/1

7.

chem10b 12.1-7

There are _____ different amino acids present in most proteins.

- | Student Response | Correct Answer | Feedback |
|-------------------------|-----------------------|-----------------|
| A. 1 | | |
| B. 2 | | |
| C. 99 | | |
| D. 16 | | |
| E. 20 | | |

8.

chem10b 12.2-9

As a polymer becomes more crystalline, _____.

- | Student Response | Correct Answer | Feedback |
|-------------------------|-----------------------|-----------------|
|-------------------------|-----------------------|-----------------|

- A. its yield stress decreases
 - B. its stiffness decreases
 - C. its density decreases
 - D. its melting point decreases
 - E. none of the above are correct
-

9.

chem10b 12.2-22

Molecules with only single bonds do not generally exhibit liquid-crystalline properties because _____.

Student Response	Correct Answer	Feedback
A. molecules without multiple bonds lack the flexibility necessary for alignment		
B. molecules with only single bonds are gases		
C. molecules without multiple bonds lack the rigidity necessary for alignment		
D. molecules without multiple bonds are too small to exhibit liquid-crystalline properties		
E. molecules with only single bonds are too big to exhibit liquid-crystalline properties		

1.

chem10b 12.2-13

Biocompatibility means that material is _____.

Student Response	Correct Answer	Feedback
A. made by biological methods		
B. integratable into living organisms		
C. biodegradable		
D. made from biological material		
E. none of the above		

2.

chem10b 12.1-3

Which one of the following is an addition polymer with the same structure as polyethylene except that one hydrogen on every other carbon is replaced by a benzene ring?

polyvinyl chloride
polypropylene
polystyrene
polyurethane
nylon 6,6

Student Response	Correct Answer	Feedback
A. polystyrene		
B. polyvinyl chloride		
C. polyurethane		
D. nylon 6, 6		
E. polypropylene		

3.

chem10b 12.4-2

Superconductors exhibit the Meissner effect.

Student Response	Correct Answer
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4.

chem10b 12.2-12

The formation of a condensation polymer generally involves _____.

Student Response	Correct Answer	Feedback
A. the formation of significant crosslinking		
B. the vaporization of a plasticizer		
C. the elimination of a small molecule		

- D. the mixing of sulfur with an addition polymer
- E. the addition of a plasticizer

5.

chem10b 12.1-6

A category _____ plastic container will generally be the most easily recycled.

Student Response	Correct Answer	Feedback
A. 1		
B. 2		
C. 3		
D. 4		
E. 22		

6.

chem10b 12.1-9

A _____ liquid crystal has the least order and is the most liquid-like.

Student Response	Correct Answer	Feedback
A. cholesteric		
B. nematic		
C. smectic B		
D. smectic C		
E. smectic		

7.

chem10b 12.2-25

Cholesteric liquid crystals have not been used for monitoring of _____.

Student Response	Correct Answer	Feedback
A. all of the above		
B. skin temperature		
C. temperature of cookware		
D. temperature of light		
E. hot spots in microelectronic circuits		

8.

chem10b 12.2-18

In what year was the first systematic work involving liquid crystals reported?

Student Response	Correct Answer	Feedback
A. 1954		
B. 1978		
C. 1943		
D. 1888		
E. 1776		

9.

chem10b 12.4-3

Polyethylene is formed by a condensation reaction.

Student Response	Value	Correct Answer
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