

***** EXAMINATION *****

**KINETIC AND MODELING INVESTIGATION ON DILUTE SULFURIC ACID
AND HOT WATER FRACTIONATION OF SELECTED BIOMASS PLAN**

1. **For many lignocellulosic substrates, hemicelluloses is**
 - a) biphasic upon dilute acid treatment
 - b) biphasic upon zoledronic acid treatment
 - c) biphasic upon nicotinic acid treatment
 - d) biphasic upon formic acid treatment

2. **Pre-treatment is a necessary element in the bioconversion**
 - a) of lignocellulosic biomass into solid and gas form
 - b) of lignocellulosic biomass into fuels and chemicals
 - c) of lignocellulosic biomass into water waste treatment
 - d) of lignocellulosic biomass into water purifier

3. **The compression process will not change the biomass**
 - a) composition but only the initial gas concentration
 - b) composition but only the initial liquid concentration
 - c) composition but only the initial solid concentration
 - d) composition but only the initial fuel concentration

4. **Sugar produced from hydrolysis of hemicelluloses is subject**
 - a) to experimental consumption
 - b) to human consumption
 - c) to composition
 - d) to decomposition

5. **The most common acid used in biomass pretreatment**
 - a) is sulfuric acid
 - b) is nitric acid
 - c) is salicylic acid
 - d) is amino acid

6. **The acid remained in solid and present in the exit streams**
 - a) can be removed simply by condensation
 - b) can be removed simply by decomposition
 - c) can be removed simply by vaporization
 - d) can be removed simply by dissolution

7. **Carbonic acid dissociates and forms the hydrogen ion to**
 - a) promote the analysis of hemicellulose
 - b) promote the hydrolysis of hemicellulose
 - c) promote the distribution of hemicellulose
 - d) promote the decomposition of hemicelluloses
8. **Enzymatic hydrolysis of pretreated substrates is performed**
 - a) in 50mL glass bottles at 20 degrees Celsius
 - b) in 150mL glass bottles at 30 degrees Celsius
 - c) in 200mL glass bottles at 40 degrees Celsius
 - d) in 250mL glass bottles at 50 degrees Celsius
9. **A gypsum is formed when limestone is used to neutralize**
 - a) the nitric acid in the pre-treatment stream
 - b) the sulfuric acid in the pre-treatment stream
 - c) the salicylic acid in the pre-treatment stream
 - d) the carbonic acid in the pre-treatment stream
10. **Carbon dioxide is a product of the fermentation of glucose**
 - a) into ethanol, and can recycled to generate carbonic acid
 - b) into ethanol, and can recycled to generate sulfuric acid
 - c) into ethanol, and can recycled to generate salicylic acid
 - d) into ethanol, and can recycled to generate nitric acid
11. **Another important feature of carbonic acid as an acidic**
 - a) pre-treatment agent is its capacity
 - b) pre-treatment agent is its heat resistance
 - c) pre-treatment agent is its buffer property
 - d) pre-treatment agent is its parameter
12. **Pre-treatment effectiveness is evaluated base on the**
 - a) retention of glucan in liquid residue
 - b) retention of glucan in solid residue
 - c) retention of glucan in gas residue
 - d) retention of glucan in chemical residue
13. **In the carbonic acid pre-treatment, the carbonic acid has**
 - a) displayed the ability to maintain its pH for 12 hours
 - b) displayed the ability to maintain its pH for 24 hours
 - c) displayed the ability to maintain its pH for 36 hours
 - d) displayed the ability to maintain its pH for 48 hours
14. **Treatment with dilute sulfuric acid is one of viable**
 - a) process options in the biomass pre-treatment
 - b) process options in the biomass treatment
 - c) process options in the decomposition of gas residue
 - d) process options in the generation of carbonic acid

15. **Sulfuric acid and carbonic acid have been equally effective**
- a) in separating the cellulose and hemicelluloses components
 - b) in decomposing the cellulose component
 - c) in decomposing the hemicelluloses component
 - d) in absorbing the cellulose and hemicelluloses components
16. **The carbonic acid is formed by dissolution of**
- a) carbon monoxide in gas
 - b) carbon monoxide in water
 - c) carbon dioxide in gas
 - d) carbon dioxide in water
17. **Carbonic acid based pre-treatment has the potential to be**
- a) an economical benign method for biomass pre-treatment
 - b) a clean benign method for biomass pre-treatment
 - c) an environmentally benign method for biomass pretreatment
 - d) All of the above
18. **At room temperature and ambient pressure, carbonic acid**
- a) maintained its pH for a period in excess of 12 hours
 - b) maintained its pH for a period in excess of 24 hours
 - c) maintained its pH for a period in excess of 36 hours
 - d) maintained its pH for a period in excess of 48 hours
19. **Carbonic acid treatment can remove lignin by at least**
- a) 40% and as much as 60%
 - b) 50% and as much as 70%
 - c) 60% and as much as 80%
 - d) 70% and as much as 90%
20. **Complete hydrolysis of the difficult hydrolyzed portion of**
- a) the hemicellulose is between 180-190 degrees Celsius
 - b) the hemicellulose is between 190-200 degrees Celsius
 - c) the hemicellulose is between 200-210 degrees Celsius
 - d) the hemicellulose is between 220-30 degrees Celsius

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