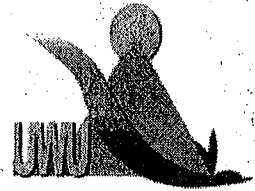


Uva Wellassa University, Sri Lanka
End Semester Examination – June 2009
BIO 431-2 Biomass Conversion



Time: Two (02) hours

Total 05 Questions

Answer four (04) questions including question number one (1).

1. You are appointed as a consultant for the Sustainable Energy Agency of Sri Lanka. You are asked to select suitable raw materials to produce bio-fuel in Sri Lanka.

I. Select three raw materials from the following list and explain the reasons for your selection

- a) Corn
- b) Wheat
- c) Coconut oil
- d) Jatropha kernel oil
- e) Cow dung
- f) Acacia wood

II. Explain the mechanism of converting two of the above materials into biofuels. (25 marks)

2. Right short notes on following three topics.

- a) Conversion of lingo-cellulosic ethanol
- b) Advantages and disadvantages of using ethanol as a transportation fuel
- c) Herbaceous energy crops (25 marks)

3. I. Briefly compare the following chemical processes.

- a) Pyrolysis /gasification
- b) Acid hydrolysis/enzyme hydrolysis
- c) Updraft gasifier/ fluidized bed reactor
- d) Direct liquefaction/ indirect liquefaction

II. Write a short note on multi-step methanol production process (25 marks)

4. a) What is equivalence ratio?
b) State equivalence ratios for pyrolysis, gasification and complete combustion
c) What are the problems associated with pyrolysis?
d) Explain the advantages of using *Syn* gas compared to direct combustion
e) Name the solid pyrolytic product of direct combustion and explain how it becomes porous

(25 marks)

5. a) What is biomass densification?
b) What are the advantages of densification?
c) Name and very briefly compare two common densification processes
d) Name possible biological sources of cellulose enzyme
e) Explain why dehydration is an essential step in ethanol production? Briefly mention the different techniques used in ethanol dehydration.

(25 marks)