Uva Wellassa University, Sri Lanka

End Semester Examination – September/October 2012

SCT 425-2 Biomass Conversion

Time: Two (02) hours

Total **Five (05)** questions.

Answer **only Four (04)** questions.

1.

(i) Define what renewable energy sources are. (04 marks)

(ii)"Biomass conversion is said to be a sustainable and demanding process nowadays in the world." Briefly explain this statement. (05 marks)

(iii) Draw a flow diagram for biochemical conversion process. (06 marks)

(iv) Discuss the advantages and disadvantages of biomass usage compared to fossil fuel usage for energy production. (10 marks)

2.

(i) Give two examples for herbaceous energy crops. (02 marks)

(ii)What are the differences between gasification and pyrolysis process? (05 marks)

(iii)Briefly explain the down draft fixed bed gasification process with suitable diagrams. (10 marks)

(iv) A group of students was given a piece of certain woody biomass to find out the heating value. They have estimated that 10g of water adsorbed due to the porosity of the woody biomass. Imagine that the total Carbon content and the total weight of the biomass are 12g and 70g respectively. The amount of heat required to convert 1kg of a liquid into the vapor without a change in temperature is 2260kJ. Find the lower heating value of the sample. (08 marks)

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3. Write short notes on any four (04) of the following.

(i) Direct & indirect liquefaction.

(ii) Heating value.

(iii) Acid hydrolysis in bioethanol production.

(iv) Biogas digesters.

(v) Gasification. (25 marks)

4.

(i) Draw a flow diagram for bioethanol production starting from wheat. (06 marks)

(ii) State two countries popular for biodiesel production and bio ethanol production respectively. (04 marks)

(iii) Briefly explain the process of biodiesel production process. (12 marks)

(iv) What is meant by B20 ? (03 marks)

5.

(i) List the parameters that can influence for the quality and quantity of biogas.

(03 marks)

(ii) Explain how you can design a small biogas plant for the university premises.

(10 marks)

(iii)"Biogas plants effectively process organic waste materials while improving the surrounding environment for the communities and reducing disposal costs". Explain this statement. (12 marks)