

**Prince of Songkla University**  
**Faculty of Engineering**

**Mid-Term Examination**

**22 December 2009**

**215-665 ENERGY FROM BIOMASS AND CONVERSION**

**Semester 1/2552**

**Time 13:30-16:30**

**Room: A401**

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**Directions**

- Closed book examination
- All types of calculator and dictionary are permitted.
- Attempt all 5 questions.
- The exam paper has 11 pages.

**Juntakan Taweekun**  
**Instructor**

<b>Problem</b>	<b>Marks</b>	
1	12	
2	10	
3	20	
4	15	
5	25	
Total	82	

Name \_\_\_\_\_

ID \_\_\_\_\_

Name \_\_\_\_\_ ID \_\_\_\_\_

**Question 1 (12 points)**

Explain the meaning of the following words

1.1 Fixed Carbon

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.....  
.....

1.2 Volatile Matter

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.....  
.....

1.3 Biomass

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.....  
.....

1.4 Proximate analysis

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.....  
.....

1.5 Ultimate Analysis

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.....  
.....

1.6 Bulk Density

.....  
.....  
.....

Name \_\_\_\_\_ ID \_\_\_\_\_

**Question 2 (10 points)**

Explain advantages and disadvantages using biomass fuels in details.

Name \_\_\_\_\_ ID \_\_\_\_\_

**Question 3 (20 points)**

3.1 Explain the meaning of the following words

1. Low Heating Value (LHV)
2. High Heating Value (HHV)
3. Dry Heating Value

Which heating value is appropriate for the use in industrial sector? Why?

Name \_\_\_\_\_ ID \_\_\_\_\_

3.2 Explain the meaning of the following words. Also give the 4 examples and application of each item

1. Fossil fuels
2. Renewable energy

Name \_\_\_\_\_ ID \_\_\_\_\_

**Question 4 (15 points)**

Explain the biomass power plant process and the function of each equipment or system.  
Also draw the diagram for this process.

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1	300	4	75	
<b>Bottom Ash</b>				
1	300	6	50	Above grate
2	450	240	2	Under grate
<b>Total Ash</b>			127	

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