

End Semester Examinations - 2015-16 Even Semester - May 2016

14ME3036 Biomass Energy

Set A

Time : 3 hrs
Total Marks: 100

1. a. Explain the working principle of a fixed dome type biogas plant? (10)
b. Describe the various biomass conversion processes? (10)

OR

2. a. Explain the biomass resources in detail? (10)
b. Explain the hydrolysis and hydrogenation process in detail? (10)

3. a. Describe the biomass liquefaction process in detail? (10)
b. Describe the pyrolysis and gasification processes in detail?. (10)

OR

4. a. Describe the anaerobic digestion process. What are its advantages? (10)
b. Explain the methanol production method from biomass? (10)

5. a. Describe the biogas yield from different organic wastes? (10)
b. Explain the working principle of a wood gasifier system? (10)

OR

6. a. Explain the operation of an internal combustion engine with biogas as fuel? (10)
b. Describe the effect of additives on biogas yield? (10)

7. a. Describe the advantages and disadvantages of biomass energy? (10)
b. Describe the world biomass energy consumption pattern? (10)

OR

8. a. Describe the method of scaling a biogas plant? (10)
b. What is digester sizing? Explain (10)

9. A school in a remote place has the following energy requirements.

- Ten lamps each of 100 CP that operate for 4 hours daily
- Six computers, each of 250, that operate for 6 hours daily by a dual fuel engine driven generator,
- 2 H.P water pump driven by dual fuel engine for 2 hours daily.

Calculate the size of the biogas plant and the number of cows required to feed the plant. Assuming the conversion efficiency of generator to be 80% and the thermal efficiency of the engine to be 25%. The heating value of biogas is 23MJ per cubic meter. Slurry density is 1090 kg per cubic meter. Take HRT is 50 day. Assume standard values of data where required. (20)

Wishing you All the Best