



KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Agrl. Engg.) 2018 Admission

V Semester Final Examination-February-2021

Fpme 3111

Bio-Energy Systems: Design and Applications (1+1)

Marks: 50
Time: 2 hours

I Define the following

(10x1=10)

1. Bioenergy
2. Pyrolysis
3. Briquetting
4. Biodiesel
5. Biogas
6. Hydraulic retention time
7. Organic loading rate
8. Ultimate analysis
9. Proximate analysis
10. Global Warming Potential

II Write Short notes on any FIVE of the following

(5x2=10)

1. What is the technical constraint in liquefying biogas for fuel purpose?
2. What is the advantage in converting solid biomass fuels to gaseous fuels?
3. What is the pre-requirement for energy conversion of MSW?
4. Which group of microorganisms is used in alcohol fermentation? Name the common species used.
5. What is the composition of producer gas obtained from biomass gasification?
6. What is meant by bio-photolysis?
7. List any 4 GHGs as per the Kyoto protocol.

III Answer any FIVE of the following.

(5x4=20)

1. With the help of a flow diagram, explain the alcohol production process.
2. Explain the biodiesel production process.
3. Explain the different methods to clean up biogas.
4. Explain the system for producer gas clean-up for use in IC engines.
5. Explain the biomass briquetting process.
6. Explain the anaerobic digestion process mentioning the different phases.
7. Give the maintenance schedule for biogas plants.

IV Write an essay on any ONE of the following

(1x10=10)

1. Explain the requirements of anaerobic high rate bioreactors for treatment and energy conversion of organic effluents. What are the different types? Explain any one type with a line diagram.
2. Explain the principle of thermo-chemical gasification of biomass mentioning the chemical reactions involved.