Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18ME3029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOMASS ENERGY** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | Describe the proximate and ultimate analysis method for biomass waste. | CO1 | 8 |
| b. | Define heating value of fuels. Write down the empirical relations for estimating heating value of biomass resource. | CO1 | 8 |
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| 2. | a. | Summarize the various biodiesel production methods. Explain any one biodiesel production method. | CO2 | 8 |
| b. | Discuss the performance of biodiesel in CI engine. Explain the advantages and disadvantages of biodiesel in engines. | CO2 | 8 |
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| 3. | a. | Explain the factors affecting generation of biogas. Write down the composition and calorific value of biogas. | CO3 | 8 |
| b. | Define anaerobic digestion process. Discuss the applications of biogas. | CO3 | 8 |
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| 4. | a. | Discuss the effect of temperature, heating rate and particle size on pyrolysis product yields. | CO4 | 8 |
| b. | Describe the chemistry of biomass gasification process. Write down the applications of gasifier. | CO4 | 8 |
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| 5. | a. | Explain the ethanol production method from sugarcane. | CO5 | 8 |
| b. | Classify the biomass liquefaction processes. Explain any one type of biomass liquefaction process. | CO5 | 8 |
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| 6. | a. | Discuss the performance of syngas in SI engine. List the advantages and disadvantages also. | CO4 | 8 |
| b. | Summarize the various biomass resources. Explain the environmental impact of biomass energy. | CO1 | 8 |
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| 7. | a. | Discuss the factors which affect the size of the biogas plants. | CO3 | 8 |
| b. | Write a brief note on vegetable oil and animal fat characteristics. | CO2 | 8 |
|  | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** |  |  |
| 8. | a. | Explain the method to find biomass combustion efficiency and amount of carbon dioxide produced for every metric ton of biomass combusted. | CO6 | 10 |
| b. | Describe the cost analysis method for a community type biogas plant. | CO6 | 10 |