

Code No: **R41087**

R10

Set No. 1

IV B.Tech I Semester Supplementary Examinations, February/March - 2018

GREEN FUEL TECHNOLOGIES

(Open Elective)

Time: 3 hours

Max. Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

- 1 a) What is combustion? What are the different forms of combustion? Compare the different types and features of biomass? [8]
b) What is CHP? Outline the flowdiagram of a small CHP using woody biomass. [7]
- 2 a) Describe with line diagram ethanol production from various types of biomass. [8]
b) Discuss the applications of enzymes in starch hydrolysis with its conditions. [7]
- 3 a) Explain bioethanol production from starch using a natural yeast strain through consolidated bioprocessing method. [8]
b) Describe the microbial production of cellulase enzyme from aspergillus niger with a neat diagram. [7]
- 4 a) Explain how biodiesel is produced from edible and non – edible oils. [8]
b) Discuss the various principles and processes involved in biodiesel production. [7]
- 5 a) Describe the production of biodiesel from vegetable oil by supercritical methanol as a catalyst. [8]
b) What is Transesterification? Explain the kinetics and mechanism of biodiesel production by transesterification method. [7]
- 6 a) A bench-scale digestion plant of mixed wastes produced the following results
Reactor volume = 2 L, Feedstock $COD_{inf} = 97,000$ mg/L, $COD_{eff} = 4,000$ mg/L, Biogas = 1.13 m³/m³-day, CH₄ = 59%, Daily feed rate = 55 mL
Determine the volume of CH₄ produced per kg of waste digested (SMP). [8]
b) Explain the different types of biodigesters with suitable diagrams. [7]
- 7 a) Explain the various biological aspects of methane fermentation in detail. [8]
b) Enumerate the various components of a hydrogen production system in detail. [7]
- 8 a) What are the challenges in Algaculture? What are the advantages of biodiesel from algae oil? [8]
b) Explain the various Research and development efforts in algal biodiesel production [7]