



GIET UNIVERSITY, GUNUPUR – 765022
M. Tech (Third Semester) Examinations, December – 2023
MOEBT3026/MOECH3026 – Waste to Energy
(Biotechnology & Chemical)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)**

- | | | |
|--|-----|----|
| a. What is biomass? Give few examples? | CO1 | K1 |
| b. What raw materials are used as a feedstock for biomass energy production? | CO1 | K2 |
| c. Analyse the Potential application of Biomass as value added products. | CO2 | K1 |
| d. What are the benefits of biomass? | CO1 | K2 |
| e. Mention the possible primary and secondary sources of solid, liquid and Gaseous Fuel. | CO3 | K3 |
| f. What is biogas? Name the major components of biogas? | CO2 | K1 |
| g. What are the advantages and disadvantages of using biogas? | CO3 | K2 |
| h. How Bio fuels differ from Petroleum Feedstock's? | CO3 | K3 |
| i. Which gases are produced during gasification? | CO4 | K2 |
| j. What biochemical's can be made from poplar? | CO1 | K1 |

PART – B**(10 x 5 = 50 Marks)**Answer ANY FIVE questions

- | | Marks | CO# | Blooms Level |
|--|-------|-----|--------------|
| 2. a. Enlist the Biomass Feedstock ,the different conversion processes for the end use as Fuels, Chemicals, Materials, Heat and Power | 5 | CO1 | K1 |
| b. Enumerate the Chemistry of Gasification. | 5 | CO1 | K2 |
| 3.a. Discuss in detail about the Overall Steps Involved in Biomass Gasification. | 6 | CO1 | K2 |
| b. Analyse the Mechanisms of the Biomass Gasification Process mentioning the schematic representation. | 4 | CO2 | K3 |
| 4.a Draw the Conceptual diagram with respect to the mechanism of gasification demonstrated in multiple steps fixed-bed (a) updraft and (b) downdraft gasifiers | 8 | CO3 | K4 |
| b. What are the responsible factors which effecting the Gasification Process | 2 | CO3 | K2 |

5.	Emphasise the Biomass-to-Bio energy production Routes through Biological conversion, Chemical conversion and Thermal conversion Processes.	10	CO2	K4
6. a.	What is the difference between 1st 2nd and 3rd generation?	3	CO3	K2
b.	Discuss with possible chemical reaction for the Biodiesel production from triglyceride oils.	7	CO3	K3
7.a.	Appraise the general overview of Industrial fermentation	4	CO4	K2
b.	Articulate the use of fermentation by microorganisms to make useful products to humans' especially viable cellular material, extracellular metabolites, intracellular components and Transformation of substrate.	6	CO4	K3
8. a.	Discuss in detail about the metabolic process that converts sugar to acids, gases or alcohol	6	CO4	K2
b.	Mentions the chemical equation of alcoholic fermentation and Lactic acid fermentation from glucose.	4	CO4	K4

--- End of Paper ---