Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Waste to Wealth **Semester: VI**

Program: B.Tech (Sustainability Engineering) **Time : 03 hrs.**

Course Code: SUEN3007 **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the chemical reaction mechanism involved in the combustion of organic matter present in municipal solid waste.	**4**	**CO1**
Q 2	Enumerate various lignocellulosic feedstocks used in the production of second-generation (2G) ethanol.	**4**	**CO2**
Q 3	Describe the role of various organisms involved in organic biomass composting.	**4**	**CO2**
Q 4	Explain the concept and significance of the 7 R's in integrated solid waste management.	**4**	**CO1**
Q 5	Discuss the step-by-step process and environmental benefits of utilizing waste plastic materials in road construction.	**4**	**CO2**
SECTION B **(4Qx10M= 40 Marks)**			
Q 6	Apply the concept of pyrolysis in municipal solid waste management and describe the working principle, key operational parameters, and the products generated.	**10**	**CO3**
Q 7	Analyze different types of batteries commonly found in electronic waste, and evaluate specific recovery and recycling techniques.	**10**	**CO4**
Q 8	A community generates 500 kg of organic waste per day that is composted using a windrow composting method. The initial moisture content of the waste is 60%, and it needs to be adjusted to 55% for optimal composting. • Calculate the amount of water that needs to be removed or added to adjust the moisture content.	**10**	**CO4**

	• If the composting process reduces the waste volume by 40%, what is the final volume of the compost? (Assume the initial density of the waste is 500 kg/m^3)		
Q 9	Apply the transesterification process to explain how waste cooking oil can be converted into biodiesel, including the chemical reaction, catalysts used, and process conditions. Or Demonstrate an understanding of municipal solid waste by defining it and identifying the different functional elements associated with its management.	**10**	**CO3**
SECTION-C (2Qx20M=40 Marks)			
Q 10	Apply the concept of incineration in solid waste management by explaining its working principle and comparing different types of incinerators used for waste disposal, highlighting their advantages, disadvantages, and practical applications.	**20**	**CO3**
Q 11	Analyze the role of vermiwash as a bio-liquid fertilizer by explaining its production process (with diagram), chemical composition, methods of application in agriculture, and the benefits it offers in sustainable farming. Or Evaluate the utilization of fly ash in construction by illustrating the reaction mechanism between fly ash and Portland cement in concrete and discussing its contribution to improved material properties and environmental sustainability.	**20**	**CO4**