Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Sixth Semester

Chemical Engineering

CH3006 - Bioenergy

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Classify biomass resources.	AN	1	2
2.	What is called biomass briquetting?	RE	1	2
3.	List out the factors affecting biogas production.	RE	2	2
4.	Mention the typical composition of biogas.	UN	2	2
5.	Define thermochemical conversion of biomass.	RE	3	2
6.	Distinguish between incineration and pyrolysis.	AN	3	2
7.	Name the types of biomass gasifiers.	RE	4	2
8.	List the end products of biomass gasification.	RE	4	2
9.	State the principal of cogeneration.	UN	5	2
10.	List the advantages of cogeneration plant.	RE	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a		Discuss in detail the sources, characteristics, preparation and chemical composition of biomass.	UN	1	13
			Or			
	b		Describe the method of size reduction, briquetting, drying, storage and handling of biomass.	UN	1	13
12.	a	i	Write about the feedstock for producing biogas.	AP	2	5
		ii	Discuss the dry and wet fermentation techniques for biogas production.	AP	2	8
			Or			
	b	i	Discuss the Microbial and biochemical aspects, kinetics and mechanism of biogas production.	AP	2	8
		ii	Discuss about the high rate digesters for industrial waste water treatment.	AP	2	5
13.	a	i	Discuss the steps involved in the thermo-chemical conversion of lignocellulosic biomass.	UN	3	7
		ii	Explain the method and equipments for incineration.	AP	3	6
			Or			

	b	i	Explain the process of liquid fuel production from biomass.	AP	3	6
		ii	Discuss the pyrolysis of biomass and the factors affecting the pyrolysis process.	UN	3	7
14.	a	i	Explain the thermochemical principles and reactions involved in biomass gasification.	UN	4	5
		ii	Explain the safety aspects of a fixed bed gasifier.	UN	4	8
			Or			
	b		Analyze the effect of pressure, temperature and introduction of steam and oxygen on biomass gasification.	AN	4	13
15.	a		Explain the principle, theory and equipment used for combustion of woody biomass.	un	5	13
			Or			
	b		Discuss the calculations and design involved in the combustion of biomass.	AP	5	13

*PART – C (Marks 1*15 = 15)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
16.	a	Discuss the design and operation of a fluidised bed gasifier with a neat diagram.	EV	4	15
		Or			
	b	Discuss with a case study the cogeneration plant in a rice mill.	EV	5	15