

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH
BRANCH: BIOTECHNOLOGY

SEMESTER : IV
SESSION : SP/2023

SUBJECT: BE318 BIOENERGY AND BIOFUELS
TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

		CO	BL
Q.1(a)	Explain the biomass conversion process and list out the different types of conversions of biomass	[5] 1	Applying
Q.1(b)	Write in detail about (i) First generation (ii) Second generation (iii) Third generation of Biofuels with suitable examples?	[5] 1	Understanding
Q.2(a)	You are trying to improve the yield of a lignocellulosic bioprocess you have developed using a Gram-negative bacterium and have identified that the levels of secreted xylanase activity are likely limiting the yield of your bioprocess. (a) How could you determine the activity of the xylanase and the proportion of the enzyme that is secreted? (b) What could you do to try and improve enzyme secretion? Explain your answer?	[5] 2	Analyze
Q.2(b)	Lignin is a complex polymer composed from a small number of monomers. a) Describe the composition of lignin (monomers present and in what ratios) in secondary plant cell walls. b) Explain how and where lignin and its monomers are made in the cell.	[5] 2	Evaluate
Q.3(a)	Compare the potential advantages and challenges of the co-location of a bioethanol plant with an existing municipal solid waste plant versus co-location with a major biomass power station in the India, in terms of (a) Feedstock supply (b) Feedstock cost (c) Fit with existing infrastructure	[5] 3	Applying
Q.3(b)	Explain the various steps involved in biogas production and the factors affecting the same. Also discuss the factors affecting the operation of biogas production.	[5] 3	Evaluate
Q.4(a)	With the help of a schematic diagram, describe the key steps involved in the production of corn bioethanol in a first-generation process and highlight the additional co-products that give value to the biorefinery	[5] 4	Evaluate
Q.4(b)	What is biodiesel and write the properties of biodiesel.	[5] 4	Analyze
Q.5(a)	Explain briefly about the Biomass energy program in India.	[5] 5	Understanding
Q.5(b)	Comment on Hydrogen as fuel of the future.	[5] 5	Analyze

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