

4. Which of the matches given below is / are correct CO2 [K₁]
- | List I | List II |
|----------------------|-------------------|
| A. First Generation | i. Non Crop foods |
| B. Second Generation | ii. Crop foods |
| C. Third Generation | Algae |
- a) 1 Only b) 1 and 2 Only
 c) 2 and 3 Only d) 3 Only
5. Middle lamella is mainly composed of CO3 [K₁]
 a) Hemicellulose b) Mumeric Acid
 c) Calcium Pectate d) All of the Above
6. Lignocellulosic biomasses are sustainable and abundantly available feedstocks for the production ----- CO4 [K₂]
 a) Biofuels b) Acid
 c) Base d) Water
7. Which of these is not a lipid? CO4 [K₂]
 a) Fats b) Oils
 c) Proteins d) Waxes
8. What chemical reaction makes biodiesel? CO4 [K₃]
 a) Transesterification b) Sublimation
 c) Polymerization d) Fermentation
9. Techno-economic analysis deals with identification of the CO5 [K₂]
 a) Demand Potential b) Supply Potential
 c) Export Potential d) Import Potential
10. _____ is the foundation on which the economic analysis is done. CO5 [K₂]
 a) Time cost b) Value of money
 c) Time value of money d) Money value of time

PART B (10 x 2 = 20 Marks)

11. Define Stoichiometry CO4 [K₁]
 12. What are Biopolymers? CO2 [K₂]
 13. How do you convert starch to ethanol? CO2 [K₂]
 14. How much ethanol is produced per ton of corn? CO2 [K₂]
 15. What is lignocellulosic biorefinery? CO3 [K₂]
 16. What is the composition of lignocellulosic feedstock? CO3 [K₂]

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| 17. What are examples of feedstock? | CO4 | [K ₂] |
| 18. What are 2 properties of all lipids? | CO4 | [K ₂] |
| 19. Define Techno-economic assessment for biorefinery. | CO5 | [K ₁] |
| 20. What is techno-economic feasibility analysis? | CO5 | [K ₂] |

PART C (6 x 5 = 30 Marks)

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|---|-----|-------------------|
| 21. Classify are the three major biopolymers group. | CO1 | [K ₁] |
| 22. How is ethanol extracted from cassava? | CO2 | [K ₂] |
| 23. Explain the Conversion of lignocellulosic biomass to bio-gasoline | CO3 | [K ₂] |
| 24. Compare the advantages and disadvantages of using biodiesel. | CO4 | [K ₃] |
| 25. State some of the methodology used in Techno-economic assessment of biorefinery product. | CO5 | [K ₃] |
| 26. Differentiate the properties and methods of producing ethanol and bioethanol with classification. | CO3 | [K ₂] |

Answer any FOUR Questions

PART D (4 x 10 = 40 Marks)

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| 27. Examine the production of Ethanol from sugarcane with a neat flow sheet. | CO1 | [K ₂] |
| 28. Classify the different types of biorefineries and explain any one of them. | CO2 | [K ₁] |
| 29. What are the products of lignin? Explain the lignocellulosic based biorefinery. | CO3 | [K ₂] |
| 30. Explain the biodiesel production process with suitable flow chart. | CO4 | [K ₃] |
| 31. Describe the Software & Data source for performing TEA. | CO5 | [K ₂] |
