CBCS SCHEME

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21BT754

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Biofuels and Bioenergy

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define biomass and explain its significance in biofuel production. **(10 Marks)**

b. Highlight on the characteristics and classification of bioenergy sources. **(10 Marks)**

OR

2 a. Describe how biomass attributes influence biofuel production. **(10 Marks)**

b. Outline different biofuel sources and their properties. **(10 Marks)**

Module-2

3 a. List the key steps involved in biogas production from organic matter. **(10 Marks)**

b. Explain the difference between thermo-chemical and biochemical conversion of biomass to fuel. **(10 Marks)**

OR

4 a. Evaluate impact of different parameters on pyrolysis during biofuel production. **(10 Marks)**

b. Discuss the environment benefits and challenges of biofuel production. **(10 Marks)**

Module-3

5 a. Identify the chemical constituents of biomass and their roles in energy generation. **(10 Marks)**

b. Discuss the concept of a circular economy based on organics in the context of biomass utilization. **(10 Marks)**

OR

6 a. Explain the different steps involved in the process of oil trans-esterification and its application in biodiesel production. **(10 Marks)**

b. Evaluate the feasibility of anaerobic digestion for biogas production in urban waste water treatment. **(10 Marks)**

Module-4

7 a. Summarize the process of bioethanol production though fermentation. (10 Marks)

b. Explain the role of reaction stoichiometry and thermodynamics in biomass conversion systems. (10 Marks)

OR

8 a. Design a basic schematic for a combustion plant for heat generation using wood chips. (10 Marks)

b. Compare the evaluate the effectiveness of gasification and pyrolysis for biomass conversion. (10 Marks)

Module-5

9 a. List different types of biofuels (all three states) and their respective applications. (10 Marks)

b. Discuss the process of algal biofuel production and highlight its advantages over conventional biofuels. (10 Marks)

OR

10 a. Propose a method for producing synthetic natural gas from biomass using Fisher Tropsch technology. (10 Marks)

b. Elaborate eon the different processes involved in biomass conversion. (10 Marks)

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