Total number of printed pages: 02 **UG/ 8th Semester/UFET811**

2024

Renewable Energy Technology

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

Attempt any <u>five</u> questions from the following 5x20

1. a) What do you understand by biomass 2

   b) Give the Structural description of lignocellulosic biomass in environment. 6

   c) Briefly explain some physicochemical properties of biomass. 4

   d) Differentiate between aerobic and anaerobic thermochemical conversion process. Explain biochemical conversion process with example. 4+4

2. a) What do you understand by biogas? 2

   b) Explain the detailed mechanism of biogas generation with biochemical reactions in an anaerobic digester. 10

   c) Discuss the influence of important factors in biomethanation process. 8

3. a) Explain fermentative production and recovery of bioethanol from lignocellulosic biomass? 8

   b) Give the biochemical reactions involved in molasses fermentation. 4

   c) Describe the biohydrogen production by light and dark fermentation. 8

4. a) What is biophotolysis? 2

   b) Differentiate between photolysis and biophotolysis? 2

   c) How biological hydrogen is produced by biophotolysis? 8

   d) Explain briefly the integrated technique of biophotolysis with biochemical conversions by predicting the yield of hydrogen during this process 8

5. a) Differentiate between surfactant and biosurfactant. Give some examples of biosurfactant producing microorganisms. 2+2

   b) Give the structural classification of biosurfactant. 2

   c) Explain the isolation and recovery of biosurfactant with flow diagram. How biosurfactant activity is measured. Give some potential applications of

biosurfactant. 3+2+3

d) What is biopolymer? How xanthan is produced microbiologically? Give some characteristic properties of xanthan gum. 1+3+2

6. a) Give the principle and mathematical expression of recovery of petroleum. 4

b) Explain the mechanism of enhanced oil recovery (EOR) with diagram by using xanthan gum as biopolymer. 4

c) What is solar panel? State different applications. 1+2

d) What do you understand by solar thermal collector? Which factors governs its performance characteristics? Explain one solar collector with diagram. 1+2+6

7. a) Explain different types of solar photovoltaic systems with suitable diagram. 7

b) Explain salinity gradient solar pond with diagram. 5

c) Describe a wind turbine system with diagram. 5

d) How tidal energy can be calculated? 3

Kokrajhar : BODOLAND
Estd. : 2006
असतो मां सद् गमय
तमसो मां ज्योतिर्गमय