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

2023

Renewable Energy Technology

Full Marks: 100

Time: Three hours

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

Attempt any five questions from the following 5x20

1. a) What do you understand by biofuel 2

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

   c) Briefly explain some chemical properties of biomass. 4

   d) Differentiate between thermochemical and biochemical conversion processes. Explain thermochemical conversion process with reactions. 2+6

2. a) What are biogas components? Mention also their percentage composition. 2

   b) Explain the detailed outline of biogas generation with role of microbes and enzymes in an anaerobic digestion unit. 10

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

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

   b) Give only the biochemical reactions involving molasses fermentation. 4

   c) Mention only the biochemical reactions occur during photosynthetic fermentation of biohydrogen production. 4

   d) Mention only the biochemical conversions occur during dark fermentation with name of enzymes. 4

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 combined technique of biophotolysis with biochemical conversions and predict the yield of hydrogen during this process 7+1

5. a) Define biosurfactant. Give some examples of biosurfactant producing organisms. 1+2

   b) Give the structural classification of biosurfactant. 2

c) Discuss the synthesis and applications of a bacterial biosurfactant. 7

d) How xanthan is produced microbiologically? Explain its role in recovery of petroleum? 3+5

6. a) Give some characteristic properties of xanthan gum. 3

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

c) What is solar panel? State its merits, demerits and different applications. 1+4

d) What do you understand by solar thermal collector? Which factors governs its performance characteristics? Explain one solar collector with its importance. 1+2+5

7. a) Draw suitable diagram of different types of solar photovoltaic systems. 5

b) Give a brief description of component parts of SPV. 6

c) Describe solar pond. 5

d) Describe nuclear fission reaction. 4