Printed Page:- **Subject Code**:- **ABT0613**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (20 ..... - 20.....)

Subject: Biofuels & Alcohol Technology

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Molasses is a by-product of which process? (CO1, K1) 1

(a) Milk processing

(b) Sugar production

(c) Brewing

(d) Distillation

1-b. What is the main reason for using stainless steel tank in alcohol storage? (CO1, K2) 1

(a) Cheap

(b) Non-reactive

(c) Heavy

(d) Easy to clean

1-c. Which of the following enhances yeast performance? (CO2, K2) 1

(a) Low pH

(b) High temperature

(c) Nutrient supplementation

(d) UV radiation

1-d. Cellulose is converted into fermentable sugars via: (CO2, K2) 1

(a) Dehydration

(b) Hydrolysis

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(c) Carboxylation
(d) Photolysis

1-e. The production of bio ethanol is by fermenting the _____ and starch components (CO3, K1) 1

(a) Acid
(b) Milk
(c) Sugar
(d) Alcohol

1-f. Which instrument is used to determine proof strength? (CO3, K2) 1

(a) Hydrometer
(b) Spectrophotometer
(c) Colorimeter
(d) Centrifuge

1-g. Which process is most suitable for wet organic waste? (CO4, K2) 1

(a) Gasification
(b) Anaerobic digestion
(c) Combustion
(d) Pyrolysis

1-h. What is the primary function of a scrubber in biomass gas cleaning? (CO4, K2) 1

(a) Reduce noise
(b) Remove tar
(c) Cool syngas
(d) Prevent fire

1-i. What is the typical oil content range in microalgae? (CO5, K2) 1

(a) 5–10%
(b) 20–50%
(c) 60–80%
(d) 90–95%

1-j. Which waste product can be reused in anaerobic digestion for energy? (CO5, K2) 1

(a) Paper
(b) Animal manure
(c) Plastic
(d) Metal

2. Attempt all parts:-

2.a. Explain the term ‘attenuation’ in yeast fermentation. (CO1, K2) 2

2.b. State any one method for fusel oil separation. (CO2, K1) 2

2.c. What is transesterification process? (CO3, K1) 2

2.d. What is methanogenesis? (CO4, K2) 2

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2.e.	What is LCA in bioenergy? (CO5, K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Write a short note on storage and handling of cereals in an industry? (CO1, K2)	6
3-b.	Illustrate the effect of contamination during storage of raw materials. (CO1, K3)	6
3-c.	Explain yeast propagation and selection criteria for industrial use. (CO2, K2)	6
3-d.	Illustrate the process of yeast protein extraction and its nutritional evaluation. (CO2, K3)	6
3.e.	Draw the flowchart of distillery quality control? (CO3, K2)	6
3.f.	Illustrate how syngas impurities affect microbial activity in fermentation. (CO4, K3)	6
3.g.	What are the benefits and challenges of using biomass and bioenergy compared to other renewable energy sources? (CO5, K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Analyze the roles of primary vs secondary metabolites in yeast-based alcohol production. (CO1, K3)	10
4-b.	Explain the regulatory and environmental factors affecting alcohol production industries. (CO1, K2)	10

5. Answer any one of the following:-

5-a.	Develop a detailed strategy to improve yeast productivity using genetic and bioprocess optimization. (CO2, K4)	10
5-b.	Assess the key challenges of using cellulosic feedstocks and propose innovative solutions. (CO2, K4)	10

6. Answer any one of the following:-

6-a.	Evaluate the future prospects of genetically modified yeast in alcohol production. (CO3, K4)	10
6-b.	Explain the bioprocess integration of yeast propagation, fermentation, and distillation. (CO3, K3)	10

7. Answer any one of the following:-

7-a.	Discuss on challenges in rural adoption of biomass-based energy and propose viable technological interventions. (CO4, K3)	10
7-b.	Discuss the implications of biomass densification on transportation and storage. (CO4, K3)	10

8. Answer any one of the following:-

8-a.	How do the properties and composition of the raw material affect the processing and extraction of value-added products, and what are the optimal conditions for each material? (CO5, K3)	10
8-b.	Illustrate with a diagram the process flow for algae-based biodiesel	10

production. (CO5, K3)

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