Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Fermentation and Industrial Microbiology — **Semester : VI**

Program: B.Tech Food Technology — **Duration : 3 Hours**

Course Code: HSMB3009 — **Max. Marks: 100**

Instructions: Read all questions carefully

S. No.	Section A Short answer questions/ MCQ/T&F 20Qx1.5M= 30 Marks)	Marks	COs
Q 1	The process of converting sugars into alcohol and carbon dioxide using yeast is called: A) Fermentation B) Photosynthesis C) Oxidative phosphorylation D) Glycolysis	1.5	CO1
Q 2	Which of the following is NOT a product of industrial microbiology? A) Antibiotics B) Enzymes C) Plastics D) Bread	1.5	CO1
Q 3	The production of alcohol from corn or sugarcane is an example of: A) Citric acid fermentation B) Lactic acid fermentation C) Ethanol fermentation D) Butanol fermentation	1.5	CO1
Q 4	The microorganism used in the production of citric acid is: A) *Saccharomyces cerevisiae* B) *Lactobacillus acidophilus* C) *Aspergillus niger* D) *Clostridium botulinum*	1.5	CO1
Q 5	The main enzyme responsible for converting milk into cheese is: A) Amylase B) Lipase C) Protease D) Lactase	1.5	CO2
Q 6	Which of the following is NOT a product of fermentation in the dairy industry? A) Cheese B) Yogurt C) Butter D) Vinegar	1.5	CO2
Q 7	Which of the following is NOT a benefit of industrial fermentation? A) Reduced waste generation B) Lower production costs C) Increased energy consumption D) Development of new products	1.5	CO2
Q 8	The microorganism used in the production of probiotics is: A) *Saccharomyces boulardii* B) *Lactobacillus acidophilus* C) *Escherichia coli* D) *Streptococcus pneumoniae*	1.5	CO2
Q 9	The heat control at large scale in the fermenter is carried out by _____ ? A) Interheating coils B) Heating jacket C) Controlled bath D) Cold-water circulation	1.5	CO3

Q 10	Which of the following is not a component of the aeration and agitation system? A) Impeller B) Baffles C) Sparger D) Thermometer	1.5	CO3
Q 11	The Batch fermenter is a/an _____ culture system? A) Open B) Closed C) Isolated D) Semi-closed	1.5	CO3
Q 12	Which growth phase is usually longer in continuous culture? A) Lag B) Log C) Stationary D) Death	1.5	CO3
Q 13	The large holes in the cheese are due to _____? A) Oxygen production B) Carbon dioxide production C) Sulfur dioxide release D) Lead dioxide release	1.5	CO4
Q 14	The enzyme responsible for converting starch into maltose during brewing is: A) Amylase B) Protease C) Lipase D) Cellulase	1.5	CO4
Q 15	Which of the following parameters increases the yield of alpha-amylase? A) Temperature B) pH C) Mutation D) Buffer	1.5	CO4
Q 16	Which of the following process encourages grain germination? A) Malting B) Milling C) Mashing D) Boiling	1.5	CO4
Q 17	The production of which of the following is NOT a result of industrial fermentation? A) Antibiotics B) Enzymes C) Ethanol D) Hydrogen gas	1.5	CO5
Q 18	The production of single-cell protein (SCP) involves the fermentation of: A) Yeast B) Bacteria C) Fungi D) Algae	1.5	CO5
Q 19	To differentiate lactose and non-lactose fermenters the medium used is A) Sugar medium B) Citrate medium C) Mac Conkey's Medium D) Mueller-Hinton medium	1.5	CO5
Q 20	Which of the following is the least preferred carbon source in industrial fermentation? A) Molasses B) Glucose C) Sulphite waste liquor D) Cellulose	1.5	CO5
Section B 4Qx5M=20 Marks)			
Q 1	Differentiate between aerobic and anaerobic fermentation?	5	CO1
Q 2	State the application of MacConkey Agar media as differential media.	5	CO2
Q 3	Explain the different steps involved in beer production in brief	5	CO3
Q 4	Argue why microbes are preferred in industries for the production of valuable products.	5	CO1
Section C 2Qx15M=30 Marks)			
Q 1	A food industry wants to produce a protease enzyme that should catalyze at a lower temperature (-10°C) conditions.	15 (8+7)	CO2

	A. How do you isolate microbes to produce protease enzymes using the methods of isolation, enrichment, and screening? B. Explain the type of substrate, organism, and the fermentation process you would apply for the production of protease enzyme and why.		
Q 2	You are venturing into starting a distillation company to produce spirits. A. Explain what the different spirits products can be produced in your company with the respective substrate. How are these products different from other alcoholic beverages like beer and wine? B. Describe the steps and procedures of spirit production in detail with an illustration	15 (8+7)	CO3
Section D **2Qx10M=20 Marks)**			
Q 1	Develop a fermentation process for wine production using apples and describe the steps involved in detail with an illustration.	10	CO4
Q 2	Differentiate the Batch, Fed-Batch, and Continuous fermentation process in a tabular form in detail.	10	CO5