Name: **Enrolment No:**	

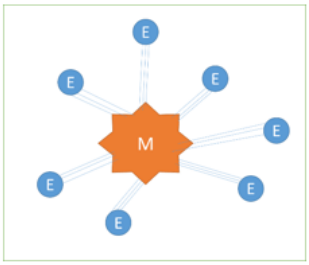
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Microbial Technology — **Semester : III**
Program: B.Tech Biotechnology — **Duration : 3 Hours**
Course Code: HSBT2004 — **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	Which of the following is not a cereal or vegetable or fruit-based fermented product? (A) Wine (B) Sauerkraut (C) Beer (D) Vinegar	1.5	CO1
Q 2	Anaerobic respiration by yeast produces (A) CO_2 (B) Wine and Beer (C) Alcohol (D) All of the above	1.5	CO1
Q 3	In dough, the starch is digested into sugar through. (A) Amylase (B) Protease (C) Maltase (D) Lactase	1.5	CO1
Q 4	Beer is produced by the fermentation of _____? (A) Barley (B) Grape (C) Rice (D) Oranges	1.5	CO1
Q 5	Which of the following is NOT a criterion to create a media? (A) It should be able to produce the maximum yield of product (B) It should be able to produce the maximum concentration of product (C) It should be easily sterilized (D) It should permit the maximum rate of product formation, no matter how costly it is	1.5	CO2
Q 6	Which of the following is NOT a criterion for the choice of an organism? (A) The organism must be genetically stable (B) The organism must be able to produce a high yield of product (C) The optimum temperature for the growth of an organism must be above 50ºC (D) The organism must be able to grow in an easily available nutrient medium	1.5	CO2

Q 7	Which of the following method is useful for the isolation and detection of organisms having the ability to produce organic acids? (A) Crowded plate technique (B) Auxanographic technique (C) Enrichment culture technique (D) Indicator dye technique	1.5	CO2
Q 8	Which of the following is NOT a cryoprotective agent? (A) DMSO (B) Glycerol (C) Ethylene glycol (D) Paraffin wax	1.5	CO2
Q 9	Which of the following sensor is used to measure the acid/alkali addition? (A) pH (B) Redox (C) Temperature (D) Oxygen	1.5	CO3
Q 10	The agitator is required to _____? (A) Provide air (B) Mixing objectives (C) Purify the product (D) Sterilize the media	1.5	CO3
Q 11	A period during which the growth rate of cells gradually increases is known as _____? (A) Lag phase (B) Log phase (C) Stationary phase (D) Death phase	1.5	CO3
Q 12	The Fed-batch fermenter is a/an _____ culture system (A) Open (B) Closed (C) Isolated (D) Semi-closed	1.5	CO3
Q 13	The fermentation of milk to form cheese is done by _____ bacterium species? (A) *Saccharomyces spp.* (B) *Lactobacillus spp.* (C) *Aspergillus spp.* (D) *Penicillium spp.*	1.5	CO4
Q 14	Citric acid is used in the manufacture of jams and jellies (A) True (B) False	1.5	CO4
Q 15	Which of the following fungi produces alpha amylase? (A) *Bacillus subtilis* (B) *Penicillium* (C) *Bacillus diastaticus* (D) *Bacillus megaterium*	1.5	CO4
Q 16	The volume of alcohol in beers is measured by _____? (A) Alcohol by weight (B) Alcohol by mass (C) Alcohol by percentage (D) Alcohol by volume	1.5	CO4
Q 17	Which of the following bond/interaction is not involved in adsorption? (A) Covalent bond (B) Ionic interaction (C) Hydrogen bond (D) Van der Waals forces	1.5	CO5
Q 18	Which of the following is not an advantage of immobilization? (A) Minimum reaction time (B) Cheap isolation of cells/enzymes (C) Can be reused (D) Less labour input	1.5	CO5

Q 19	What does the following diagram represent?  (A) Covalent binding (B) Adsorption (C) Entrapment (D) Membrane confinement	1.5	CO5
Q 20	Which of the following is not a property of carrier matrices? (A) Thermal stability (B) Stability of the material (C) Physical strength (D) Easily available	1.5	CO5
Section B (4Qx5M=20 Marks)			
Q 1	List any five components of the fermenter and their function.	5	CO1
Q 2	Describe the stages involved in the selection of industrially important microbes.	5	CO2
Q 3	Distinguish between oxygen uptake rate (OUR) and oxygen transfer rate (OTR) and explain the formula to measure OUR and OTR.	5	CO3
Q 4	Illustrate the design of a solid-state fermenter and list the solid substrates used.	5	CO3
Section C (2Qx15M=30 Marks)			
Q 1	A scientist wants to produce an antibiotic that should be active at higher pH conditions. A. How do you isolate microbes to produce the antibiotic using the methods of isolation, enrichment, screening, and strain improvement? B. Explain the type of fermentation process you would apply to produce the antibiotic and why?	15	CO2
Q 2	A dairy company would like to produce lactose-free milk with the use of enzyme immobilization technology. A. Explain what enzyme you would use to immobilize to produce lactose-free milk and what type of immobilization method you would apply and why?	15	CO5

	B. Write the applications of enzyme immobilization in industries and list the major products obtained using the immobilized enzyme		
Section D **(2Qx10M=20 Marks)**			
Q 1	Discuss strain improvement and its significance. Write any two different methods used for strain improvement with an illustration.	10	CO2
Q 2	Write the process of beer production and the fermentation steps involved in detail with an illustration.	10	CO4