
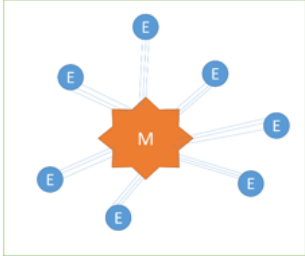


| Name:   |  |  |     |
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| Enrolment No:   |  |   |     |
| <b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b><br><b>End Semester Examination, December 2023</b>         |  |   |     |
| <b>Course: Microbial Technology</b><br><b>Program: B.Tech Biotechnology</b><br><b>Course Code: HSBT2004</b> |  | <b>Semester : III</b><br><b>Duration : 3 Hours</b><br><b>Max. Marks: 100</b>        |     |
| <b>Instructions: Read all questions carefully</b>   |  |   |     |
| S. No.  | Section A<br>Short answer questions/ MCQ/T&F<br>(20Qx1.5M= 30 Marks)   | Marks   | COs |
| Q 1   | What is the process of using microorganisms to break down organic matter in the absence of oxygen called?<br>(A) Fermentation (B) Anaerobic digestion<br>(C) Photosynthesis (D) Aerobic respiration  | 1.5   | CO1 |
| Q 2   | Which microorganism is commonly used in the production of yogurt and cheese?<br>(A) Saccharomyces cerevisiae (B) Lactobacillus bulgaricus<br>(C) Escherichia coli (D) Streptococcus pyogenes   | 1.5   | CO1 |
| Q 3   | Which of the following is an example of a genetically modified microorganism (GMO) used in microbial technology?<br>(A) E. coli engineered to produce insulin<br>(B) Wild-type Saccharomyces cerevisiae<br>(C) Natural strain of Streptococcus pyogenes<br>(D) Unmodified Lactobacillus bulgaricus | 1.5   | CO1 |
| Q 4   | Which microorganism is used in the production of biocontrol agents for pest management?<br>(A) Bacillus thuringiensis (B) Lactobacillus bulgaricus<br>(C) Streptococcus pyogenes (D) Aspergillus niger   | 1.5   | CO1 |
| Q 5   | What is the purpose of using microbial leaching in mining processes?<br>(A) To increase metal content in ores<br>(B) To reduce the need for water in mining operations<br>(C) To eliminate all microorganisms from mining sites<br>(D) To prevent soil erosion                                     | 1.5   | CO2 |

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| Q 6  | Which microorganism is commonly used in the production of antibiotics like streptomycin and tetracycline?<br>(A) Streptomyces (B) Pseudomonas<br>(C) Bacillus subtilis (D) Escherichia coli                         | 1.5 | CO2 |
| Q 7  | What is the process of using microorganisms to clean up oil spills called?<br>(A) Bioremediation (B) Bioleaching<br>(C) Fermentation (D) Clarification  | 1.5 | CO2 |
| Q 8  | A period during which the growth rate of cells gradually increases is known as _____?<br>(A) Lag phase (B) Log phase (C) Stationary phase<br>(D) Death phase  | 1.5 | CO2 |
| Q 9  | Citric acid is used in the manufacture of jams and jellies<br>(A) True (B) False  | 1.5 | CO3 |
| Q 10 | The Batch fermenter is a/an _____ culture system?<br>(A) Open (B) Closed (C) Isolated (D) Semi-closed   | 1.5 | CO3 |
| Q 11 | The large holes in the cheese are due to _____?<br>(A) Oxygen production (B) Carbon dioxide production<br>(C) Sulfur dioxide release (D) Lead dioxide release   | 1.5 | CO3 |
| Q 12 | Which of the following process encourages grain germination?<br>(A) Malting (B) Milling (C) Mashing (D) Boiling   | 1.5 | CO3 |
| Q 13 | Which of the following is not a method of immobilization?<br>(A) Entrapment (B) Ionic bonding (C) Adsorption<br>(D) Encapsulation   | 1.5 | CO4 |
| Q 14 | The preservation by liquid nitrogen is called as _____?<br>(A) Cryopreservation (B) Lyophilization (C) Freeze-drying<br>(D) Desiccation   | 1.5 | CO4 |
| Q 15 | What does the following diagram represent?<br><br>(A) Covalent binding (B) Adsorption (C) Entrapment<br>(D) Membrane confinement | 1.5 | CO4 |

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| Q 16   | Which of the following is NOT a criterion to create a media?<br>(A) It should be able to produce the maximum yield of product<br>(B) It should be able to produce the maximum concentration of product<br>(C) It should be easily sterilized<br>(D) It should permit the maximum rate of product formation, no matter how costly it is                                    | 1.5 | CO4 |
| Q 17   | Which of the following is not a component of the aeration and agitation system?<br>(A) Impeller (B) Baffles (C) Sparger (D) Thermometer   | 1.5 | CO5 |
| Q 18   | The type of fermentation observed in yeasts is<br>(A) Acrylic fermentation (B) Lactic acid fermentation<br>(C) Pyruvic fermentation (D) Alcoholic fermentation  | 1.5 | CO5 |
| Q 19   | Which of these is NOT a product of fermentation?<br>(A) Lactate (B) Oxygen (C) Carbon dioxide (D) Ethanol   | 1.5 | CO5 |
| Q 20   | Which of the following is a disadvantage of an immobilized enzyme?<br>(A) Immobilization process allows a continuous process<br>(B) Immobilization means additional cost<br>(C) Increase productivity<br>(D) Immobilization prevents loss of activity   | 1.5 | CO5 |
| <b>Section B</b><br><b>(4Qx5M=20 Marks)</b>  |   |     |     |
| 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  | Evaluate the role of agitation in oxygen transfer.  | 5   | CO3 |
| Q 4  | Argue why microbes are preferred in industries for the production of valuable products.   | 5   | CO1 |
| <b>Section C</b><br><b>(2Qx15M=30 Marks)</b> |   |     |     |
| Q 1  | A. How do you produce antibiotics in your industry and what would be the preferred primary screening method? <b>(5 marks)</b><br>B. Formulate a medium (carbon and nitrogen source) out of waste product to produce an antibiotic. <b>(5 marks)</b><br>C. Which fermentation process (Batch or Fed-Batch or continuous) you would apply and explain why? <b>(5 marks)</b> | 15  | CO2 |

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| Q 2                                   | In a wine-producing company, they encounter overproduction of foam during fermentation.<br>A. Explain how would you reduce or clear the foam using chemical or physical measures?<br>B. State the principle and ideal properties of chemicals used for foam clearance in industrial fermentation<br>C. List the examples of different chemicals used for foam clearance | 15 | CO3 |
| <b>Section D</b><br>(2Qx10M=20 Marks) |   |    |     |
| Q 1                                   | Write the process of beer production and the fermentation steps involved in detail with an illustration.  | 10 | CO4 |
| Q 2                                   | Compare the different methods of enzyme immobilization methods with illustrations and evaluate the pros and cons of each method.  | 10 | CO5 |