

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

**CLASS: IMSc**  
**BRANCH: FOOD TECHNOLOGY**

**SEMESTER: V**  
**SESSION : MO/2019**

**SUBJECT : IMF5007 FERMENTATION FOOD PRODUCTS**

**TIME: 1.5 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

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- Q1 (a) Briefly describe the methods used for isolation of pure cultures [2]  
(b) Enlist the names of industrially important types of fermentation processes. Write short notes on fermentations related to. [3]  
(i) sporulation and  
(ii) negligible water
- Q2 (a) Differentiate Enriched media and Enrichment media with examples [2]  
(b) Describe the batch production of 2% low fat plain yogurt detailing all the parameters [3]
- Q3 (a) What is  $K_L a$ ? What is its significance? Explain why it has unit of  $\text{time}^{-1}$ ? [2]  
(b) Write the mathematical expressions for impeller power associated with. [3]  
(i) Ungassed newtonian fluid (Laminar and turbulent regime) and  
(ii) Gassed Fluids. Also write the expression for impeller Reynold's no. of power law and pseudo plastic fluids
- Q4 (a) Name the design of bioreactors associated with following terms: [2]  
(i) Single cell protein  
(ii) vaccines  
(iii) Enzymes  
(iv) volatile products  
(b) Briefly describe the chemical method for determination of  $K_L a$  [3]
- Q5 (a) Describe the transport path of oxygen molecule from air to cell in a bioreactor indicating the various resistances faced by it. [2]  
(b) A fermentation broth with viscosity  $10^{-2}$  Pa.s, density  $1000 \text{ Kg/m}^3$  and volume  $2.7 \text{ m}^3$  is stirred by an impeller of dia  $0.5 \text{ m}$  at  $1 \text{ rps}$ . Estimate mixing time. Also, write the final expressions of Monod model and M-M Model. [3]
- Q6 (a) Write summarized notes on four types of sterilization methods used in bioreactors [2]  
(b) Draw a simplified block diagram flow sheet for ethanol production by indirect hydration and write the basic chemistry involved in the process [3]