BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.SC **SEMESTER : II**
BRANCH: BIOTECHNOLOGY **SESSION : SP/19**

SUBJECT: BT416 ENZYME AND BIOPROCESS TECHNOLOGY

TIME: 3.00 Hrs. **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Describe the assumptions adopted for the unstructured and non-segregated model for modelling of microbial growth. Also, derive an expression for specific growth rate in presence of limiting nutrient 'S'. [5]

Q.1(b) Describe the meaning of degree of reduction., Calculate the degree of reduction of substrate $C_{12}H_{22}O_{11}$ and biomass $CH_{1.66}O_{0.27}N_{0.20}$. [5]

Q.2(a) Derive an expression for rate of reaction for single enzyme single substrate enzyme catalyzed reaction. [5]

Q.2(b) L-Asparaginase was allowed for catalysis in presence of L-Asparagine. Following data were obtained. Calculate V_{max}, K_m and k_2. Given $[E_o]$= 0.012 g/l. [5]

V_o (g/l-min)	0.67	0.51	0.41	0.34	0.29
S_o (g/l)	20	10	6.7	5.0	4.0

Q.3(a) How to prepare sterilized air for sparging in medium present in a CSTR? Construct a system for this. [5]

Q.3(b) What do you mean by Del factor? How will you use it for design of a batch sterilization process? [5]

Q.4(a) Plan a method for determination of K_La of a medium containing Escherichia coli in its log phase. [5]

Q.4(b) Compare a basic agitator with modern agitator (used in a CSTR) with respect to shape, mode of operation, medium characteristics and flow pattern of medium in side CSTR. [5]

Q.5(a) 'For production of primary metabolites, CSTR operated in continuous mode is better than batch mode'. Justify the statement. [5]

Q.5(b) Draw a CSTR and lebel it. How will you change a batch CSTR into continuous CSTR? Write your strategy. [5]

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