Printed Pages: 02 **Sub Code: NBT 053**

Paper Id: 154238 **Roll No.** | | | | | | | | | | |

B TECH

(SEM-VIII) THEORY EXAMINATION 2018-19

INDUSTRIAL BIOTECHNOLOGY

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Define Data Analysis?
b. Differentiate between a bubble column and a membrane reactor?
c. Define Baffles?
d. Explain the term zero order reaction?
e. Define parallel bioreactor?
f. What is Exit age distribution?
g. What are the applications of bioconversion?
h. Define pesticides?
i. Define economics of bio fuels?
j. Define immobilized cells. Give examples for immobilized matrix

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Define the process flow diagram with neat sketch?
b. Explain briefly about the enzyme catalyzed reactions in CSTRs.
c. Describe in detail how the study of heterogeneous reaction is useful to a bioprocess engineer. Give some reactions in support of your ideas.
d. How do you interpret the batch reactor data to obtain the kinetics of a reaction? Explain integral method of analysis using first-order irreversible reaction as an Example
e. Write notes on the following : (i) PID Controllers (ii) Physical and Chemical environment of a bioreactor

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe different types of ideal reactors and explain why they are called ideal reactors?
(b) Develop the governing equation for Fluidized bed reactor. Mention its significance.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Write in detail scale up method based on physical concept. How may the above concept be used in case of an agitated fermentor vessel?
(b) What is biomass wash-out with reference to a CSTR? Suggest the ways to avoid it.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Determine the product concentration (C_p), overall yield and overall operational yield in (i) CSTR and (ii) Plug flow reactor taking the following given data into consideration. A =P , 2A =5, R_p =1.0 CA (kmol/m^3s), R, =0.5 C_a^2(kmol/m^3s) The feed contains C A_o =1 (kmol/ms), C_{po} =0. Conversion of 98% is desired.

(b) Describe the experimental method for determining RTD for Non ideality in bioreactors.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is residence time distribution? Define E, C and F curves.

(b) Distinguish between order of a reaction and molecularity of a reaction. Write down the 1st and 2nd rate kinetics reaction for an ideal reaction.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Name different industrially useful enzymes, source of organisms and growth condition?

(b) List out different microbial systems and enzymes used in steroid transformation with examples?