

Do Samrat  
Basal

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MID TERM (SUMMER SEMESTER EXAMINATION) June-2018

B.Tech 5<sup>th</sup> Semester

COURSE CODE: 15B11BT511

MAX. MARKS: 50

COURSE NAME: Bioprocess Engineering

COURSE CREDITS: 4

MAX. TIME: 2 Hrs

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. a) What do you understand by term cell yield? [2]  
b) Determine the doubling time of the *E. coli* culture if it is growing with a specific growth rate  $20 \text{ min}^{-1}$ . [2]  
c) What do you understand by Diauxic growth? [2]  
d) What are the major reasons for entering a cell from exponential phase to the deceleration phase? [2]  
e) Why a chemostat cannot run at  $D > \mu$ ? [2]
2. a) Define Leudeking pirt equation and its significance. [4]  
b) Whether the biomass productivity is higher in batch mode of fermentation? Justify your answer in detail. [2]  
c) Define Monod's equation. Discuss about the significance of of saturation constant ( $K_s$ ) in the selection of substrate? [4]
3. Differentiate Between [6]  
a) Growth associated and Non-growth associated products  
b) Batch and continuous culture
4. a) What do you understand by volumetric mass transfer coefficient? [2]  
b) What are the different methods for the determination of  $K_{La}$ ? [2]  
c) Explain the dynamic gassing out method for determining the  $K_{La}$  value. Also explain the advantages and disadvantages of the method. [6]
5. Suppose you are interested in the production of a product which requires different operating conditions in fermenter for optimal production from those required for the growth of the cells. How will you synthesize such product through chemostat? Draw the fermenter. [4]
6. List the various factors which affect the  $K_{La}$ ? [5]
7. a) Define Ficks' Law of Diffusion. [2]  
b) List the various factors which affect the cellular oxygen demand. [3]