Poonam

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- Oct 2017

B.Tech III[rd] Semester

COURSE CODE: 10B11BT311 MAX. MARKS:25

COURSE NAME: Thermodynamics and Chemical processes

COURSE CREDITS: 4 MAX. TIME: One Hour Thirty Minutes

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

Q1(a). How the product synthesis effect theoretical oxygen demand? 2

(b). Write equations for conservation of mass for processes with and without reaction. 2

(c). How maximum possible yield of biomass differs from maximum possible yield of product? 2

Q2. Initial rate data is listed below. Calculate Vmax and Km

Lactose concentration (mol l^{-1} X 10^{2})	Initial reaction velocity (mol l^{-1} min^{-1} X 10^{3})
2.50	1.94
2.27	1.91
1.84	1.85
1.35	1.80
1.25	1.78
0.730	1.46
0.460	1.17
0.204	0.779

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Q3. Production of protein having composition ($CH_{1.55}O_{0.31}N_{0.25}$) by a genetically strain *E. Coli* ($CH_{1.77}O_{0.49}N_{0.24}$) is proportional to cell growth. Ammonia is used as nitrogen source for aerobic respiration of glucose. The yield of biomass from glucose is measured as 0.48gg^{-1} and the yield of protein is 20% of biomass.

(i) How much ammonia is required?

(ii) What is the oxygen demand?

(ii) If the biomass yield remains same, how much ammonia and oxygen requirements differs if biomass is unable to synthesize protein. 7

Q4. Corn- steep liquor (125 kg) contains 2.5% invert sugars and 50% water; rest can be considered as solids. Beet molasses (45 kg) containing 50% sucrose, 1% invert sugars, 18% water and the remainder solids. Both beet molasses and corn steep liquor mixed together in mixing tank. Water is also added as separate component. Final product containing 2% invert sugars as one component is obtained.

(i) How much water is required?

(ii) What is the concentration of sucrose in final product? 7