

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

**CLASS: BTECH  
BRANCH: BIOENGINEERING**

**SEMESTER : VI  
SESSION : SP/2023**

**SUBJECT: BE307 BIOPROCESS ENGINEERING**

**TIME: 3 Hours**

**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.
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		CO	BL
Q.1(a) Analyze different steps of microbial growth in batch mode of culturing correlating with specific growth rate constant?	[5]	4	5
Q.1(b) Explain the different ways for measuring the cell growth with their limitations?	[5]	2	2
Q.2(a) Differentiate between theoretical yield and actual yield?	[5]	1	4
Q.2(b) The production of a biomass from hexadecane is given below: $C_{16}H_{34} + aO_2 \longrightarrow cCH_{1.66}O_{0.27}N_{0.2} + dCO_2 + eH_2O$ CH <sub>1.66</sub> O <sub>0.27</sub> N <sub>0.2</sub> is biomass. If RQ is 0.43, determine the stoichiometric coefficient?	[5]	3	2
Q.3(a) Derive the equation for heat destruction of contaminating organisms? Mention the role of del factor in the sterilizer design?	[5]	4	3
Q.3(b) Explore the different properties of immobilizing matrices/supports?	[5]	3	1
Q.4(a) Investigate the salient features of non-conventional bioreactors?	[5]	5	6
Q.4(b) Compare between Batch and Continuous sterilization of an industrially used media?	[5]	2	3
Q.5(a) Investigate the stability related issues in a Biocatalyst and improvement mechanism?	[5]	5	6
Q.5(b) Evaluate the significant features of fed-batch reactor?	[5]	4	5

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