Dr. Harkapati Vijayakar

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS, DEC- 2021
MSc, III Semester

COURSE CODE: 20MS1BT311 **MAX. MARKS:** 35
COURSE NAME: BIOPROCESS ENGINEERING AND TECHNOLOGY
COURSE CREDITS: 03 **MAX. TIME:** 2 Hours

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

1. As a bioprocess engineer, Bioinvent firm contacted you for the suggestion of culturing microbial and animal cell cultures for producing a bioprocess product. Explain them which type of bioreactor configurations is better for culturing of microbial and animal cell cultures by discussing the different configuration characteristics? **(5 M)**
2. What is the necessity of mixing in a bioreactor? How the mixing is different with the CSTR, bubble column and air-lift reactors? **(5 M)**
3. Suppose you got a chance to produce the bioproduct with with immobilized cells, explain the advantages and disadvantages of immobilized-cell reactor systems and also discuss the different characteristic features of immobilized cell reactors? **(5 M)**
4. Which aspect of bioprocess engineering differentiates the high cost of Mab and low cost of citric acid (CA)? What are the product characteristics priorities in producing Mab & CA? With a neat sketch explain the different steps involved in production of Mab & CA? **(5 M)**
5. What is the necessity of going for enzyme immobilization? What are the selected characteristic parameters of enzyme and carrier need to consider before going for immobilization of enzymes? What are characteristic features need to check for the finished immobilized enzyme? **(5 M)**
6. Why the bioprocess engineers give primary importance for "Mass transfer"concept? What are the different phases (depict through a neat diagram) that have to be cross for reaching the oxygen from air bubble to microbial cell in a bioreactor? What is the significance of K_La in bioprocess engineering and mention the factors affecting the K_La? **(5 M)**
7. How the "scale-up" concept differs with the "scale-down" in bioprocess engineering? Write the common scale-up rules need to be maintained while transferring lab scale results to the Industrial scale? Write about the reasons for scaling down to the lab scale from industrial-scale? **(5M)**

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