Reg. No. :

Question Paper Code: 2144233

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024
Fourth Semester
Biotechnology
U20BT401 - BIOPROCESS PRINCIPLES
(Regulation 2020)

Time: Three Hours   Maximum: 100 Marks

Answer ALL questions

PART – A   (10 x 2 = 20 Marks)

1.   Distinguish aerobic and anaerobic fermentation.

2.   List out the different functions of baffles.

3.   Expand and signify ANOVA in statistical optimization.

4.   Mention the role of precursors in fermentation with two examples.

5.   Signify the importance of DEL factor.

6.   Milk is pasteurized but not sterilized. Comment the reason.

7.   Define Respiratory Quotient.

8.   State the functions of Degrees of Freedom in metabolic stoichiometry of microbes.

9.   Recall the Monad equation.

10.   Spell out the indirect methods for biomass estimation.

PART – B   (5 x 16 = 80 Marks)

11. (a)   Differentiate the components required for a fermentation process with a neat diagram.   (16)

(OR)

(b)   Compare and contrast the traditional and modern biotechnology process.   (16)

12. (a)   Expound the procedure involved in the optimization of medium using placket Burman design and its significance.   (16)

(OR)

(b)   Describe the requirement of components for a good fermentation medium. Add short notes on examples of simple and complex microbial medium.   (16)

13. (a)   Compare and contrast depth filters with absolute filters used in sterilization of liquid media with suitable applications.   (16)

(OR)

(b)   Converse and explicate the various methods used in sterilization of air. Add short notes on sterilization equipment.   (16)

14. (a)   Production of single cell protein from hexadecane is given by the following reaction: (16)
$C_{16}H_{34} + aO_2 \longrightarrow cCH_{1.66}O_{0.27}N_{0.2} + dCO_2 + eH_2O$
$CH_{1.66}O_{0.27}N_{0.2}$ represents biomass, if RQ = 0.43, Determine the stoichiometric coefficients.

(OR)

(b)   Discuss the mechanism of oxygen consumption and heat evolution in aerobic cultures of bioprocesses.   (16)

15. (a)   Discourse the unstructured kinetic model for microbial Growth.   (16)

(OR)

(b)   Assess the four phases in batch culture of microorganisms in a bioreactor with suitable performance equations.   (16)

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