Reg. No. : | | | | | | | | | | |

Question Paper Code: 94D06

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Fourth Semester

Biotechnology

19UBT406- Bioprocess principles

(Regulation 2019)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Illustrate various stages involved in bioprocess.	CO1- U
2.	What grades of steel is used in the fermenters and mention their composition.	CO1- U
3.	How does the credibility of the experimental design was analyzed in RSM?	CO3- U
4.	Does bacteria need amino acid as component in growth media? Justify your answer.	CO3- U
5.	Define Decimal reduction time.	CO1- U
6.	Write the significance of D - Value	CO1- U
7.	What is known as available electron explain with an example?	CO1- U
8.	Illustrate various stages of effluent treatment.	CO1- U
9.	Differentiate Primary and Secondary metabolites	CO1- U
10.	Draw the spectrum of electromagnetic radiation.	CO1- U

PART – C (5 x 16= 80 Marks)

11.	(a)	Draw an overall flowchart of anamylase production and purification and explain it in detail	CO1- U	(16)
		Or		
	(b)	Illustrate the stages of downstream processing and explain various separation techniques in detail.	CO1- U	(16)
12.	(a)	Explain in detail about criteria of good medium and explain the role of different media components	CO1- U	(16)

Or

(b) Illustrate the classification various media for microbial growth and explain each type in detail. CO1- U (16)

13. (a) Illustrate the classification of filters and explain the filter used for continuous filtration and the type of filter which uses vacuum for filtering the molecules in detail CO1- U (16)

Or

(b) Explain in detail about different filtration methods based on pore size of the membrane CO1- U (16)

14. (a) Aerobic dehydration of benzoic acid by mixed culture can be represented by following reaction: CO4- E (16)

$$C_6H_5COOH + aO_2 + bNH_3 \longrightarrow cC_5H_7NO_2 + dH_2O + eCO_2$$

After the reaction the reaction gives respiratory quotient of 0.7.

1. Determine the stoichiometry coefficients
2. Determine degree of reduction of the substrate molecule

Determine the yield coefficient with respect to each of the reactants.

Or

(b) Certain organisms have shown that cells can convert the carbon substrate to biomass with the conversion efficiency of 67% w/w. Calculate the stoichiometric coefficients for the following biological reaction CO4- E (16)

$$C_{16}H_{34} + aO_2 + bNH_3 \longrightarrow c\,[C_{4.4}H_{7.3}N_{0.86}O_{1.2}] + dH_2O + eCO_2$$

and also determine degree of reduction of the substrate molecule and respiratory quotient

15 (a) Illustrate various methods for estimating microbial growth and explain them in detail. CO1- U (16)

Or

(b) Make a block diagram of ethanol production and explain it in detail. CO1- U (16)