A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 94D05

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

Fourth Semester

Biotechnology

19UBT405- Fluid Particle Mechanics and Mechanical Operations

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Differentiate specific volume and specific weight.	CO3- Ana
2.	State Newton's Law of Viscosity.	CO1- U
3.	Define minimum fluidization velocity.	CO2- U
4.	Define fluidization.	CO2- U
5.	Classify the types of forces applied inn size reduction of particles.	CO3- Ana
6.	State Bond's law.	CO1- U
7.	Sketch the model of an agitator.	CO2- App
8.	Sketch the flow pattern when the impeller is placed off-center of an agitator.	CO2- App
9.	Predict the criteria for selection of filter media.	CO4- E
10.	Define the time of drying.	CO1- U

PART – C (5 x 16= 80 Marks)

11.	(a)	Explain with schematic sketch- the principle, working of Rotameter and discuss the advantages and disadvantages of it.	CO1- U	(16)
		Or		
	(b)	Explain with schematic sketch- the principle, working of Bourdon gauge and discuss the advantages and disadvantages of it.	CO1- U	(16)
12.	(a)	Illustrate the mechanism of fluidization analyzing the factors and explain its types.	CO2- App	(16)

Or

	(b)	Illustrate the principle, working of peristaltic pump with a neat sketch and elucidate its advantages, disadvantages and application.	CO2- App	(16)
13.	(a)	Analyze the nature of the balls used in ball-mill. Elucidate the principle, working, advantages, disadvantages and applications of ball-mill with a neat sketch.	CO3- Ana	(16)
		Or		
	(b)	Illustrate the principle, working of hammer-mill with a neat sketch and elucidate its advantages, disadvantages and application.	CO2- App	(16)
14.	(a)	The power required by an agitator in the tank is a function of the following variables. Diameter of the agitator, number of rotations of the impellor per unit time, viscosity of liquid, density of liquid. From dimensional analysis using Buckingham's method, obtain a relation between power and the four variables. From dimensional analysis using Buckingham's method, obtain a relation between power and the four variables. From dimensional analysis using Buckingham's theorem, obtain a relation between power and the four variables.	CO4- E	(16)
		Or		
	(b)	Explain the Buckingham's theorem and derive a relation between pressure drop and four variables d (diameter of the particle),v (velocity of the particle),ρ (density of the particle), μ (viscosity of the particle) using the same.	CO4- E	(16)
15	(a)	Explain the mechanism and application of batch dryers with example.	CO2- U	(16)
		Or		
	(b)	Elucidate the principle of sedimentation and the regimes of settling.	CO2- U	(16)