REG.NO.:

VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT: F2+TF2

SCHOOL OF CHEMICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

Programme Name & Branch	: B. Tech & BCM
Course Code and Course Name	: BCHE301L & Mechanical Operations
Faculty Name(s)	: Dr. Mohammed Rehaan Chandan
Class Number(s)	: VL2024250103070
Date of Examination	: 18-10-2024
Exam Duration	: 90 minutes

Maximum Marks: 50

General instruction(s):

- Assume any missing data with proper justification

Q. No	Question	Marks
1.	Screen motion are achieved using various methods and tools, describe with diagram the motion of gyration in vertical plane, gyration at one end and shaking at other, mechanical vibration and electrical vibration.	10
2.	An iron ore initially contains 5.15% Fe. After carrying out a froth flotation separation, the products are as shown in Table below.	10

Product	%weight	%Fe assay
Feed	100	5.15
Concentrate	10	35.0
Tailing	90	0.05

Using this data, calculate:

a) Ratio of concentration
b) % Metal Recovery
c) % Metal Loss
d) % Weight Recovery, or % Yield
e) Enrichment Ratio

In a mixture of quartz, specific gravity 2.65, and galena, specific gravity 7.5, the size of the particles range from 0.00052 cm to 0.0025 cm. On separation in a hydraulic classifier with water as a medium, under free settling conditions, three fractions are obtained: one consisting of only quartz, one of only galena and one mixture of quartz and galena. What are the ranges of particle sizes of the two substances in mixed portion? — 10

A batch sedimentation centrifuge has a diameter of 600 mm and a height of 300 mm. It is used to separate 25 liters of an aqueous slurry containing suspended solids of average particle size 2 μm and density = 2600 $kg.m^{-3}$. The bowl is rotated at 1000 rpm. Find the time required to free the liquid from solid impurities. Compare with the time it would take for these particles to settle by gravity in that same bowl. — 10

A slurry consists of 2% by weight of solids with density 2500 kg/m^3 is to be clarified by continuous sedimentation. Feed to the clarifier is 5000m^3/day. The underflow contains 10% solids. Design the thickener. — 10

Batch sedimentation test data is

Time (min)	0	5	12	24	40	70	250	1000
Height of interface(H) (cm)	40	25	15	8	5	3	1.8	1.7

***