Form A: Paper –Setting Blank Ref No.: Ex/PG/CE/T/129E/2024

M.E. CIVIL ENGG. 1ST YEAR, 2ND SEMESTER EXAMINATION, 2024

(~~1st~~ / 2nd Semester / ~~Repeat~~ / ~~Supplementary~~ / ~~Annual~~ / ~~Biannual~~)

SUBJECT: INDUSTRIAL WASTEWATER TREATMENT

(Name in full)

Full Marks: 100

Time: ~~Two hours~~/Three hours/~~Four hours~~/ ~~Six hours~~ (60 marks for this part)

Use a separate answer-script for each part

No. of Question	Part-I	Marks
	Answer Question 1 and any three from the rest	
Q.1) a)	State the basic steps associated with **chemical pulping process** of pulp manufacturing?	6
b)	What do you mean by **"Pasteurization of Milk"**? How is it carried out in modern dairy plants?	(2+3)
c)	Describe in brief the **"Reduction Method"** for demercurization of wastewater emanating from a **chlor-alkali industry.**	4
Q.2) a)	Draw a **neat process flow chart** for a typical **small-scale bovine slaughter house** and mark the potential points of effluent generation.	6
b)	Discuss in brief on the following operations involved in bovine slaughtering process. **ii)Antemortem ii) Dressing**	(2+2)
c)	State the **pollution abatement measures** recommended for small scale bovine slaughter houses.	5
Q.3) a)	Describe with the help of *neat diagram and pertinent reactions* the basic process involved in a typical **mercury cell chlor-alkali unit.**	7
b)	What do you mean by **"Brine Mud"**? How can we perform **"Debrining"** and **"Demercurization"** of the **"Brine Mud"** in **mercury cell chlor-alkali unit?**	(2+3+3)
Q.4) a)	Discuss in brief on the following activities involved in **market milk production unit.** **ii) Clarification ii) Cleaning-in-process system iii) Standardization**	(3+3+3)
b)	Discuss in brief on **different treatment alternatives** recommended by CPCB for **modern dairy plants.**	6

[Turn over

Form A: Paper –Setting Blank Ref No.: Ex/PG/CE/T/129E/2024

M.E. CIVIL ENGG. 1ST YEAR, 2ND SEMESTER EXAMINATION, 2024

(~~1st~~ / 2nd Semester / ~~Repeat~~ / ~~Supplementary~~ / ~~Annual~~ / ~~Biannual~~)

SUBJECT: INDUSTRIAL WASTEWATER TREATMENT

(Name in full)

Full Marks: 100

Time: ~~Two hours~~/Three hours/~~Four hours~~/ ~~Six hours~~ (60 marks for this part)

Use a separate answer-script for each part

No. of Question	Part-I	Marks
Q.5) a)	State the **major environmental issues** related to Indian textile industries.	3
b)	What are the **characteristic parameters** for typical textile industry wastewater?	3
c)	Discuss with the help of a **neat treatment flow chart** the significances of different unit operations and processes provided in a typical textile industry.	9

Ref. No.: Ex/PG/CE/T/129E/2024

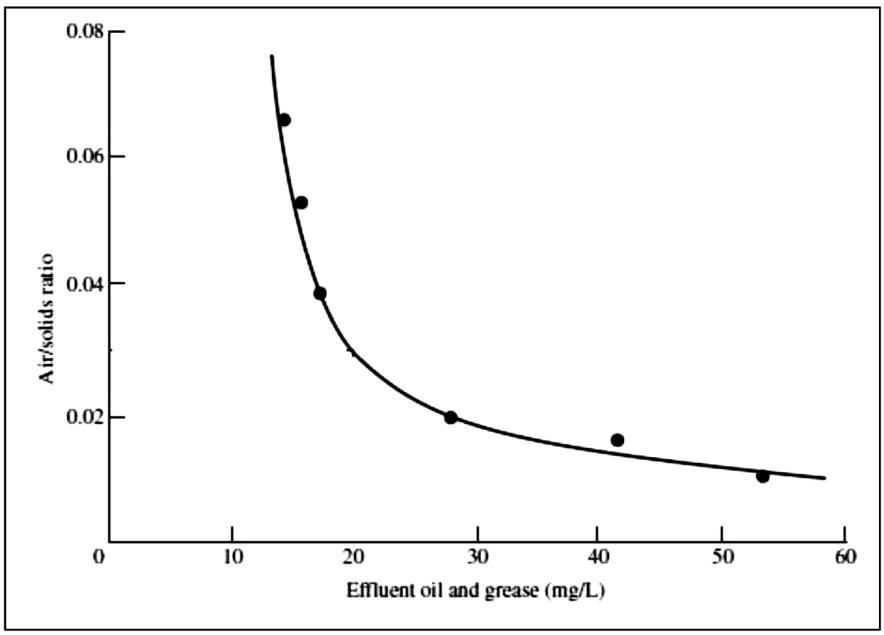
M.E. CIVIL ENGINEERING FIRST YEAR SECOND SEMESTER EXAM - 2024

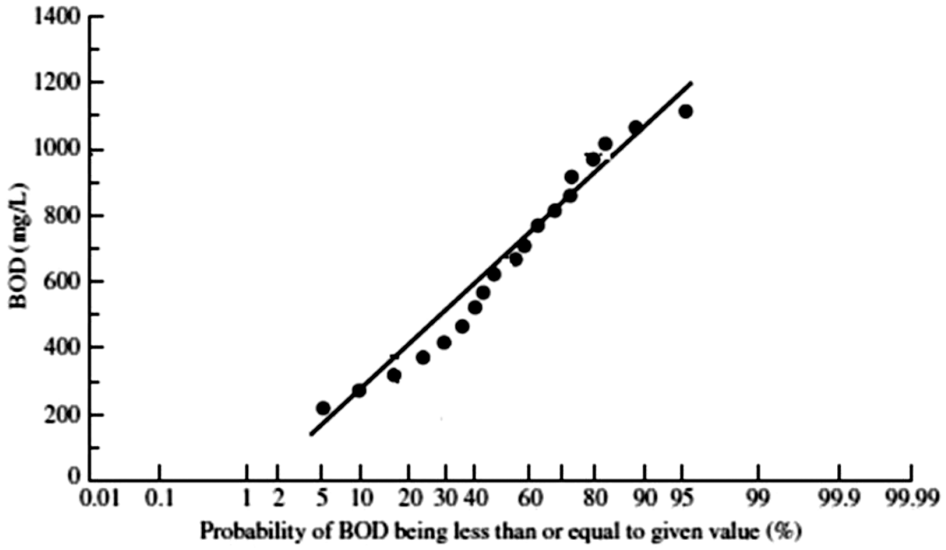
SUBJECT: INDUSTRIAL WASTEWATER TREATMENT (PG/CE/T/129E/2024)

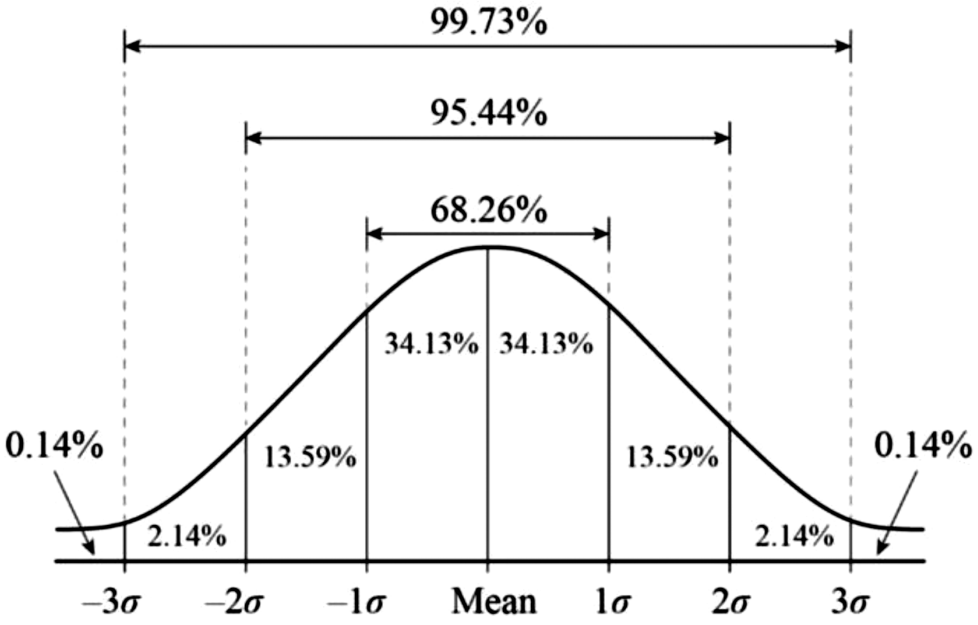
Time: 3 hours **Full Marks: 40**

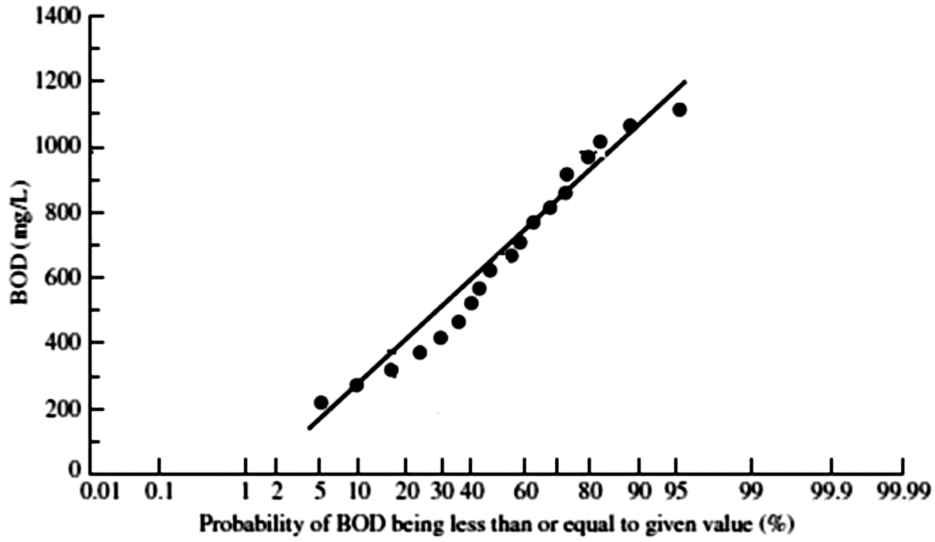
Instructions: Use Separate Answer scripts for each part.

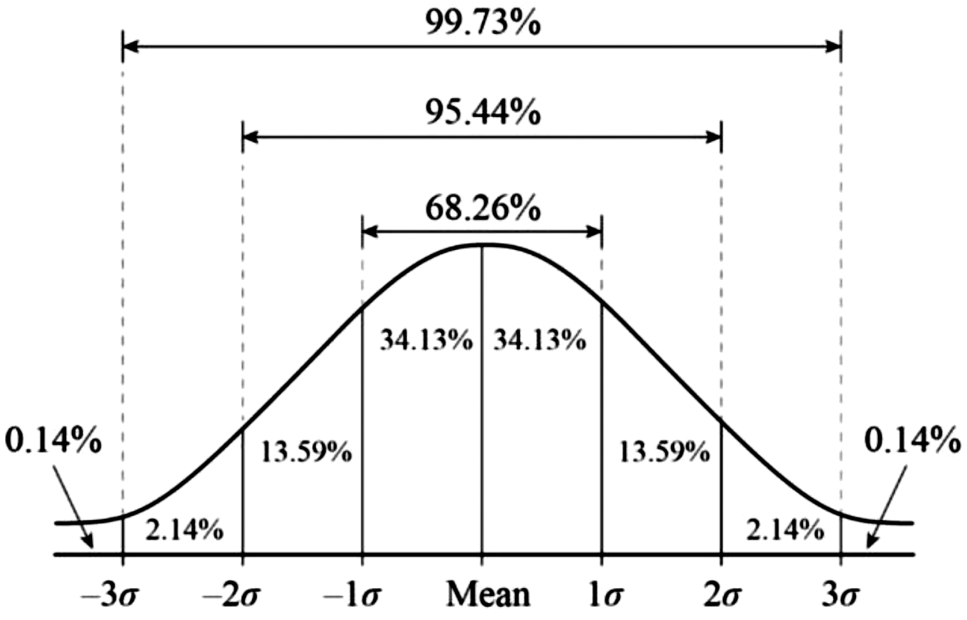
Part - II

Sl. No.	Question	CO	Marks
1	A wastestream of 0.57 m^3/min and a temperature of 103°F (39.4°C) contains significant quantities of non-emulsified oil and non-settleable suspended solids. The concentration of oil is 120 mg/L. Reduce the oil to less than 20 mg/L. Laboratory studies showed: Alum dose = 50 mg/L Pressure = 515 kPa absolute or 4.1 relative atm pressure Sludge production = 0.64 mg/mg alum Sludge = 3 percent by weight Calculate: **(a) The recycle rate** **(b) Surface area of the flotation unit** **(c) Sludge quantities generated**  Fig -1 : Effects on A/S on effluent quality. At 103°F (39.4°C) the weight solubility of air is 18.6 mg/L. The value of f is assumed to be 0.85.		[12]
2	Write down the basic equations for different types of precipitation process for removing heavy metal.		[4]


1400
1200
1000
800
600
400
200
0
BOD (mg/L)
0.01 0.1 1 2 5 10 20 30 40 60 80 90 95 99 99.9 99.99
Probability of BOD being less than or equal to given value (%)


99.73%
95.44%
68.26%
34.13%
34.13%
0.14%
13.59%
13.59%
0.14%
2.14%
2.14%
−3σ
−2σ
−1σ
Mean
1σ
2σ
3σ


1400
1200
1000
800
600
400
200
0
BOD (mg/L)
0.01 0.1 1 2 5 10 20 30 40 60 80 90 95 99 99.9 99.99
Probability of BOD being less than or equal to given value (%)


99.73%
95.44%
68.26%
34.13%
34.13%
13.59%
13.59%
2.14%
2.14%
0.14%
0.14%
−3σ
−2σ
−1σ
Mean
1σ
2σ
3σ