Total No. of Questions :– [6] Total No. of Printed Pages:– [2]

G.R. No.	

PAPER CODE	P.122 - 223 BSE/BSE

May 2022 / INSEM+ENDSEM

F. Y. M. TECH. (WREE-Civil) (SEMESTER – II)

COURSE NAME: Industrial Waste Water Treatment

COURSE CODE: CVPA12203

(PATTERN 2020)

Time: [3 Hours] [Max. Marks: 60]

(*) Instructions to candidates:

1) **All Questions are compulsory**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) a) What are physical and chemical characteristics of textile, dairy industries. [5]

b) Elaborate unit operation carried out in industrial waste water. [5]

Q.2)a) Estimate the volume of equalization tank required cum. in ETP for the following data. [5]

Q m3/min	12	18	22	29	35	39	42	52	60
Time (hr)	1	2	3	4	5	6	7	8	9

b)Discuss various method are used for removal of Chromium and Nickel from waste water. [5]

Q.3)a)Aerobic biological process is carried out in treatment of industrial waste water for the following parameters

I/F BOD= 800 mg/l, E/F BOD= 50 mg/L, X= 5000 mg/L, Xr=10000 mg/l, HRT= 4.5 hr, MCRT =10d, K=0.1/day , Q(discharge) 20MLD, Y=0.5, K_d=0.06/day. Find Volume of tank, Y observed, Sludge production, BOD removal efficiency, F/M ratio, Volumetric loading rate. [5]

b)Explain Fluidized bed reactor working mechanism in anaerobic treatment system. [5]

Q.4)a) What are different method for removal of color from industrial waste water. [5]

b) Determine power required for electro dialysis process for the following data

1. Q= 4000 m^3/d, 2. TDS= 2000 mg/L, 3.No of Cells= 300
4. Cation and anions concentration =0.011 Eq/L , 5. Salt removal Efficiency=50%, Current efficiency =90% ., R= 50 ohm [5]

Q.5) Design CETP for following data [10]

1. Q= 50 m^3/d , 2. pH= 11- 12 , 3. BOD at 27^{0}C = 70 mg/L
4. TDS= 3000 mg/L 5. TS= 6000 mg/L 6.Iron concentration = 700 mg/L
7. COD= 5000 mg/L at 27 ^{0}C, 8. Color is present in waste water.

Find 1. Volume of sedimentation tank

2. Acid required for neutralization if 3 lit acid required for 1 m3/d of E/F pH
3. Quantity of lime required for removal of Iron take lime consumption as 1mg/L of Iron required 0.5 mg/L of lime
4. Select suitable method for removal of COD and BOD
5. F/M ratio.

Q.6) Draw flow diagram for manufacturing process and treatment process for textile, paper and pulp industries. Also write chemical composition in tabular form. [10]

******End*******