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## ΟΠΙΑΡΑΤ ΤΕΩΙΝΟΙ ΟΩΙΩΑΙ ΠΝΙΙΜΕΡΟΙΤΑ

	GUJAKA BE - SEMESTI	I IEC ER-VII	LHNUI	LUGI( Exami	LAL U	INI V EJ 7 - SUMB	KSLLY JER 2019		
Subject Code: 2171306 Date:							Date:27/(	27/05/2019	
ject	Name: Wastev	water E	Ingineer	ring					
ne: 02	2:30 PM TO 0	5:30 PN	ฬ	0		r	Fotal Mar	:ks: 70	
ructio	ns:								
1.	Attempt all questions. Make suitable assumptions wherever necessary								
2. 3.	Figures to the right indicate full marks.								
	0 0	2						MARKS	
(a)	Discuss in brief the classification of screen							03	
<b>(b)</b>	Write a short not	1			04				
(c)	Discuss the operational problems of UASB reactor						07		
(a)	Enlist various ap	proaches	s for the d	lesign of	esign of anaerobic digestors				
<b>(b)</b>	Discuss the design criteria for aerated grit chamber							04	
(c)	Discuss with the neat sketch offline and inline equalization								
(c)	<b>UR</b> Determine the volume of equalization basin from the following data of								
(C)	time period vs. average flow during the time period where $M = midnight$								
	Time period	M_4	1_8	8-12	12-16	16-20	20-M		
	Avg flow	0.15	04	0.6	03	0.2	0.25		
	cu.m/s	0110		0.0	0.0	0.2	0.20		
<b>(a)</b>	Discuss the operational problems of suspended growth process.							03	
<b>(b)</b>	Write a short note: high rate clarifier							04	
(c)	Write down the procedure for the design of UASB reactor								
(a)	Explain the operational problems of chemical unit processes								
(b)	Draw only a neat flow diagram of sludge drying beds								
(c)	Discuss the design of extended aeration							07	
<b>(a)</b>	Write down the equations used for the calculation of organic loading rate and sludge loading rate							03	
( <b>b</b> )	Discuss the design criteria of rotating biological contactor (RBC).								
(c)	Design a suitable grit chamber to cater the need of a town having 0.2 0								
	million population with approximately 150 Litre per capita per day of								
	sewage contribut	tion.		<b>OD</b>					
(a)	What can be don	a to prov	ont cludo	OR o bulking	<b>.</b> 9			02	
(a)	Finist the various sludge handling equipments used and discuss any one in							03	
(0)	brief								
(c)	Design a rotating biological contactor system for the flow of 5 MLD having								
	BOD <sub>5</sub> of 120 mg/L. The treated effluent should meet the discharge criteria								
	of less than 30 mg/L of BOD <sub>5</sub> . Assume maximum permissible organic								
(c)	loading rate as $0.05 \text{ kg BOD}_5/\text{m}^2$ .d							0.2	
(a) (h)	Draw only a neat sketch of Biotower							U3 04	
(D) (C)	Design a bar screen for a peak flow of 50 MLD							07	
	<b>pject pject pject n: 1. 2. 3.</b> (a)         (b)         (c)         (a)         (b)         (c)	GUJARA BE - SEMESToject Code: 2171300oject Name: Wastevne: 02:30 PM TO 0ructions:1. Attempt all quest2. Make suitable as3. Figures to the rig(a) Discuss in brief f(b) Write a short not(c) Discuss the oper(a) Enlist various ap(b) Discuss the desig(c) Determine the vtime period vs. atTime periodAvg. flow, cu.m/s(a) Discuss the oper(b) Write a short not(c) Determine the vtime period vs. atTime periodAvg. flow, cu.m/s(a) Discuss the oper(b) Write a short not(c) Write down the period(a) Explain the oper(b) Draw only a neat(c) Design a suitable million populati sewage contribut(a) What can be dom(b) Enlist the variou brief(c) Design a rotating BOD5 of 120 mg of less than 30 loading rate as 0(a) Enlist various m(b) Draw only a neat (c) Design a bar screen	GUJAKAT TEC BE - SEMESTER-VII oject Code: 2171306 oject Name: Wastewater E ne: 02:30 PM TO 05:30 PM ructions: 1. Attempt all questions. 2. Make suitable assumption 3. Figures to the right indica (a) Discuss in brief the classi (b) Write a short note: design (c) Discuss the operational p (a) Enlist various approaches (b) Discuss the design criteri (c) Determine the volume o time period vs. average fl $\overline{\frac{\text{Time period } M-4}{\text{Avg. flow, } 0.15}}$ (a) Discuss the operational p (b) Write a short note: high r (c) Write down the procedure (a) Explain the operational p (b) Write a short note: high r (c) Write down the procedure (a) Explain the operational p (b) Draw only a neat flow dia (c) Discuss the design of extuants (a) Write down the equations and sludge loading rate. (b) Discuss the design criteri (c) Design a suitable grit cf million population with sewage contribution. (a) What can be done to prev (b) Enlist the various sludge for brief (c) Design a rotating biologic BODs of 120 mg/L. The to of less than 30 mg/L of loading rate as 0.05 kg B (a) Enlist various means throw (b) Draw only a neat sketch of (c) Design a bar screen for a	GUJAKAT TECHNOL         BE - SEMESTER-VII(NEW)         oject Code: 2171306         oject Name: Wastewater Engineer         ne: 02:30 PM TO 05:30 PM         ructions:         1. Attempt all questions.         2. Make suitable assumptions wherev         3. Figures to the right indicate full ma         (a) Discuss in brief the classification of         (b) Write a short note: design of greas         (c) Discuss the operational problems of         (a) Enlist various approaches for the of         (b) Discuss the design criteria for aera         (c) Determine the volume of equalizing time period vs. average flow durin         Image: Time period M-4 4-8         Avg. flow, 0.15 0.4         cum/s         (a) Discuss the operational problems of         (b) Write a short note: high rate clarified         (c) Write down the procedure for the of         (a) Explain the operational problems of         (b) Draw only a neat flow diagram of         (c) Discuss the design of extended aer         (a) Write down the equations used for         and sludge loading rate.         (b) Discuss the design criteria of rotat         (c) Design a suitable grit chamber to         million population with approxin sewage contribution.         (a) What can be done to prevent	GUJAKAT TECHNOLOGIC BE - SEMESTER-VII(NEW) EXAMIN oject Code: 2171306 oject Name: Wastewater Engineering ne: 02:30 PM TO 05:30 PM ructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necess: 3. Figures to the right indicate full marks. (a) Discuss in brief the classification of screen (b) Write a short note: design of grease remova (c) Discuss the operational problems of UASB (a) Enlist various approaches for the design of (b) Discuss the design criteria for aerated grit c (c) Discuss the design criteria for aerated grit c (c) Determine the volume of equalization bas time period N-4 4-8 8-12 Avg. flow, 0.15 0.4 0.6 cu.m/s (a) Discuss the operational problems of suspen (b) Write a short note: high rate clarifier (c) Write down the procedure for the design of Mrite a short note: high rate clarifier (c) Write down the procedure for the design of (c) Discuss the design of extended aeration (a) Explain the operational problems of sludge drift (c) Discuss the design of extended aeration (a) Write down the equations used for the calc and sludge loading rate. (b) Discuss the design of extended aeration (a) Write down the equations used for the calc and sludge loading rate. (b) Discuss the design of extended aeration (c) Design a suitable grit chamber to cater the million population with approximately 15 sewage contribution. (a) What can be done to prevent sludge bulking (b) Enlist the various sludge handling equipment brief (c) Design a rotating biological contactor syster BODs of 120 mg/L. The treated effluent sho of less than 30 mg/L of BOD5. Assume r loading rate as 0.05 kg BOD3/m <sup>2</sup> .d (a) Enlist various means thro' which aeration c (b) Draw only a neat sketch of Biotower (c) Design a bar screen for a peak flow of 50 M	GUJAKAT TECHNOLOGICAL U BE - SEMESTER-VII(NEW) EXAMINATION oject Code: 2171306 oject Name: Wastewater Engineering ne: 02:30 PM TO 05:30 PM ructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. (a) Discuss in brief the classification of screen (b) Write a short note: design of grease removal (c) Discuss the operational problems of UASB reactor (a) Enlist various approaches for the design of anaerobic (b) Discuss the design criteria for aerated grit chamber (c) Discuss the design criteria for aerated grit chamber (c) Determine the volume of equalization basin from t time period vs. average flow during the time period v $\frac{Time period}{Vite} \frac{M-4}{Vite} \frac{4\cdot8}{Vite} \frac{8\cdot12}{Vite} \frac{12\cdot16}{Vite}$ (c) Write a short note: high rate clarifier (c) Write down the procedure for the design of UASB re 0R (a) Explain the operational problems of suspended grow (b) Write a short note: high rate clarifier (c) Write down the procedure for the design of UASB re 0R (a) Explain the operational problems of chemical unit pr (b) Draw only a neat flow diagram of sludge drying beds (c) Discuss the design of extended aeration (a) Write down the equations used for the calculation of and sludge loading rate. (b) Discuss the design of reteria of rotating biological contt (c) Design a suitable grit chamber to cater the need o million population with approximately 150 Litre p sewage contribution. 0R (a) What can be done to prevent sludge bulking? (b) Enlist the various sludge handling equipments used a brief (c) Design a rotating biological contactor system for the f BODs of 120 mg/L. The treated effluent should meet of less than 30 mg/L of BODs. Assume maximum loading rate as 0.05 kg BODs/m <sup>2</sup> .d (a) Enlist various means thro' which aeration can be pro (b) Draw only a neat sketch of Biotower (c) Design a barscreen for a peak flow of 50 MLD.	GUJARAT FECHNOLOGICAL UNIVER BE - SEMESTER-VII(NEW) EXAMINATION – SUMN pject Code: 2171306 jject Name: Wastewater Engineering he: 02:30 PM TO 05:30 PM ructions:1. Attempt all questions.2. Make suitable assumptions wherever necessary.3. Figures to the right indicate full marks.(a) Discuss in brief the classification of screen (b) Write a short note: design of grease removal (c) Discuss the operational problems of UASB reactor(a) Enlist various approaches for the design of anaerobic digestor (b) Discuss the design criteria for aerated grit chamber (c) Discuss with the neat sketch offline and inline equalization $OR$ (c) Determine the volume of equalization basin from the follow time period vs. average flow during the time period where M $\overline{\frac{\text{Time period}}{\text{M-4}} \frac{\text{M-4}}{4.8} \frac{8.12}{12.16} \frac{12.26}{16.20}$ Avg. flow, 0.150.4 Discuss the operational problems of suspended growth process (b) Write a short note: high rate clarifier (c) Write down the procedure for the design of UASB reactor $OR$ (a) Explain the operational problems of suspended growth process (b) Draw only a neat flow diagram of sludge drying beds (c) Discuss the design of extended aeration (a) Write down the equations used for the calculation of organic and sludge loading rate.(b) Discuss the design of the of rotating biological contactor (RH (c) Design a suitable gri chamber to cater the need of a town million population with approximately 150 Litre per capita sewage contribution.0R(a) What can be done to prevent sludge bulking?(b) Discuss the design of the adding equipments used and discus brief(c) Design a rotating biological contactor system for the flow of 51 BOD5 of 120 m	GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VII(NEW) EXAMINATION – SUMMER 2019         ject Code: 2171306         Date:27/0         ject Code: 2171306         Total Mar         Date:27/0         ject Code: 2171306         Total Mar         Objects colspan="2">Total Mar         Total Mar          Total Mar	



**Q.5** 

(a) Write down the major equations used for the design of Biotower 03

- 04
- (b) Discuss the step by step design of SBR
  - Design a conventional activated sludge system having diffused aeration for 07 (c) the domestic wastewater having flow of 6300 m<sup>3</sup>/d, and having influent BOD<sub>5</sub> as 220 mg/L. Assume the removal efficiency of 30% in primary treatment.

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