Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER III (NEW) – EXAMINATION – WINTER-2016

Subject Code: 2731806 **Date:25/10/2016**

Subject Name: Industrial Wastewater Management

Time:02:30 pm to 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What are the objectives of a typical Common Effluent Treatment Plant (CETP)?	**07**
	(b)	What is Cleaner Production? Enlist and explain the objectives and scope of Cleaner Production.	**07**
Q.2	**(a)**	Enlist the techniques for recovery of heavy metals from wastewater and explain any one in detail.	**07**
	(b)	Enlist and explain the environmental considerations for locating industries.	**07**
		OR	
	(b)	Enlist the thermal techniques for treatment of high strength or concentrated waste waters and explain any two in detail.	**07**
Q.3	**(a)**	Enlist the industrial wastewater sources of chromium and explain the techniques for its removal.	**07**
	(b)	Write a note on cyanide pollution and its removal processes.	**07**
		OR	
Q.3	**(a)**	What are the sources of nickel pollution ? Enlist and explain its removal techniques.	**07**
	(b)	Enlist the sources of iron in wastewater. Explain electro coagulation and chemical precipitation methods for its removal.	**07**
Q.4	**(a)**	Enlist the constraints of Common Effluent Treatment Plants.	**07**
	(b)	Enlist the suspended growth processes for removal of nitrogen from industrial waste water and explain any two in brief.	**07**
		OR	
Q.4	**(a)**	Suggest the methods of effluent volume reduction at a large scale industry.	**07**

Q.4	**(b)**	What are refractory organics? Enlist and explain any two of its removal technique.	**07**
Q.5	**(a)**	Enlist the points to be considered while selecting surface waters as a point of discharge of effluent.	**07**
	(b)	Explain how the industrial wastewater differs from domestic waste water with the help appropriate examples.	**07**

OR

Q.5	**(a)**	Highlight the advantages and disadvantages of effluent and stream standards with the help of relevant examples.	**07**
	(b)	What are the chief considerations before selecting municipal sewers and oceans for discharge of effluents.	**07**

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