

Hall Ticket No.

Question Paper Code: ACE526



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-I

B.Tech VI Semester End Examinations (Regular), May – 2020

Regulations: IARE-R16

INDUSTRIAL WASTE WATER TREATMENT

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT-I

1. (a) Differentiate treatment process in treatment plants for Municipal and Industrial wastewater. [7M]
(b) Explain in detail about the effects of Industrial effluents on sewer and Natural water bodies. [7M]
2. (a) Describe the following characteristics of wastewater in detail of the following [7M]
(1). pH (2) Solids (3) BOD₅ (4) COD (5) Heavy Metals
(b) Explain briefly the methods of removal of suspended solids from Industrial wastewater. [7M]

UNIT-II

3. (a) Explain briefly about preliminary and primary treatment methods for industrial wastewater. [7M]
(b) Explain the necessity of equalization and proportioning for industrial waste water treatment [7M]
4. (a) Enumerate the basic theories of Industrial wastewater management and explain the Strength reduction. [7M]
(b) What is the necessity of Neutralization in Industrial waste treatment? Explain the working of the same with suitable examples. [7M]

UNIT-III

5. (a) Write an essay on heavy metal poisoning and their prevention with a suitable example in soil due to point load? Explain its limitations? [7M]
(b) Express the need for the effluent standards and stream standards in waste water treatment [7M]
6. (a) Why are solvents, grease, cyanide, phenol and sulphates considered undesirable for discharge into public sewers? [7M]
(b) Explain briefly the nitrogen removal by biological nitrification and de-nitrification. [7M]

UNIT - IV

- 7 (a) Explain in detail about the impacts of petroleum exploration and its production on the environment. [7M]
(b) Describe in detail the methods for controlling the pollution from food and beverage Industries. [7M]
- 8 (a) What are the characteristics of petrochemical Industrial wastewater? Explain them briefly. [7M]
(b) Discuss the characteristics of sugar mill waste water and also describe the different process involved in production of sugar. [7M]

UNIT – V

- 9 (a) With the neat process flow sheet, highlight the origin and characterization of wastewater generated in typical tannery industry [7M]
(b) With the neat process flow sheet, highlight the origin and characterization of wastewater generated in textile industry. [7M]
- 10 (a) What are the advantages of combined treatment of industrial waste water with domestic wastewater? [7M]
(b) Describe the characteristics of Atomic Energy plants effluents and also explain two methods of treatment of wastewater. [7M]



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COURSE OBJECTIVES:

The course should enable the students to:

I	Distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation
II	Understand the industrial process, water utilization and waste water generation
III	Acquire the knowledge on operational problems of common effluent treatment plants.
IV	Impart knowledge on selection of treatment methods for industrial wastewater

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

ACE526.01	Know the Sources of pollution like Nonpoint sources, including storm water runoff.
ACE526.02	Understand the Physical, chemical, organic and biological properties of industrial wastes.
ACE526.03	Define the Characteristics and composition of waste water.
ACE526.04	Effects of industrial effluents on sewers and natural water bodies.
ACE526.05	Understand the Pre and primary treatment methods of wastewater.
ACE526.06	Know the detailed procedure of Equalization of wastewater sample.
ACE526.07	Perform the 'Proportioning' of the influent for treatment.
ACE526.08	Carry out the 'Neutralization' of the sample to change the P^H of the waste sample to value 7.0.
ACE526.09	Know the various methods for 'Oil separation by floatation' while wastewater treatment process.
ACE526.10	Know the alternative production strategies in industries to reduce wastewater.
ACE526.11	Minimize the effects of Industrial Wastes on receiving Streams and Treatment Plants is to reduce the Volume of such Wastes
ACE526.12	Reduce the strength of wastes by Process Changes, Equipment Modifications, Segregation of Wastes
ACE526.13	Know the available various wastewater treatment methods.
ACE526.14	Understand the detailed concept of Nitrification and De-nitrification.
ACE526.15	Remove the Phosphorous from the influent in treatment plant.
ACE526.16	Remove the Heavy metals, special treatment methods.
ACE526.17	Know Membrane separation processes that include MicroFiltration (MF), UltraFiltration (UF), NanoFiltration (NF), ReverseOsmosis (RO), Dialysis, and ElectroDialysis
ACE526.18	Remove volatile compounds by Air stripping and absorption processes.
ACE526.19	Know the existing methods for Disposal of treated waste water.
ACE526.20	Know the manufacturing processes of industries like food processing, sugar, steel, petroleum refineries.
ACE526.21	Characterize the composition of industries like textiles, tanneries, atomic energy plants and other mineral processing industries.
ACE526.22	Have knowledge on joint treatment of raw industrial wastewater and domestic sewage
ACE526.23	Understand the Common effluent treatment plants location, design, and operation and maintenance problems.

Mapping of Semester End Examination to Course Learning Outcomes

SEE Question No		Course Learning Outcomes	Course Outcomes	Blooms Taxonomy Level	
1	a	ACE526.01	Know the Sources of pollution like Nonpoint sources, including storm water runoff.	CO 1	Remember
	b	ACE526.04	Effects of industrial effluents on sewers and natural water bodies.	CO 1	Understand
2	a	ACE526.03	Define the Characteristics and composition of waste water.	CO 1	Remember
	b	ACE526.01	Understand the Pre and primary treatment methods of wastewater	CO 1	Understand
3	a	ACE526.05	Understand the Pre and primary treatment methods of wastewater.	CO 2	Remember
	b	ACE526.06	Know the detailed procedure of Equalization of Wastewater sample	CO 2	Remember
4	a	ACE526.08	Reduce the strength of wastes by Process Changes, Equipment	CO 2	Understand
	b	ACE526.10	Carry out the 'Neutralization' of the sample to change the P ^H of the	CO 2	Understand
5	a	ACE526.11	Remove the Heavy metals, special treatment methods	CO 3	Remember
	b	ACE526.11	Know the alternative production strategies in industries to reduce waste water	CO3	Remember
6	a	ACE526.13	Know the various methods for 'Oil separation by floatation' while wastewater treatment process.	CO 3	Understand
	b	ACE526.15	Understand the detailed concept of Nitrification and De-nitrification	CO 3	Understand
7	a	ACE526.16	Know the manufacturing processes of industries like food processing, sugar, steel, petroleum refineries.	CO 4	Remember
	b	ACE526.17	Know the manufacturing processes of industries like food processing, sugar, steel, petroleum refineries.	CO 4	Remember
8	a	ACE526.16	Know the manufacturing processes of industries like food processing, sugar, steel, petroleum refineries.	CO 4	Understand
	b	ACE526.18	Know the manufacturing processes of industries like food processing, sugar, steel, petroleum refineries.	CO 4	Remember
9	a	ACE526.20	Characterize the composition of industries like textiles, tanneries, atomic energy plants and other mineral processing industries	CO 5	Remember
	b	ACE526.22	Characterize the composition of industries like textiles, tanneries, atomic energy plants and other mineral processing industries	CO 5	Remember
10	a	ACE526.23	Have knowledge on joint treatment of raw industrial wastewater and domestic sewage.	CO 5	Understand
	b	ACE526.23	Understand the Common effluent treatment plants location, design, and operation and maintenance problems	CO 5	Understand

Signature of Co-ordinator

HOD, CE