

Register Number:

9021

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2005

(Environmental Engineering)

(Second Semester)

ENVC-201. Industrial Waste Water Treatment

(Common with Part-time)

May)

(Time: 3 Hours)

Maximum: 60 Marks

Answer any five questions

- 1a. Define point and non-point sources of water pollution and give few examples for each. (6 Marks)
- 1b. Why is it essential for an operator to understand the sources of industrial wastes? (6 Marks)
- 2a. List the sources of heavy solids that can cause plugging of sewers. (6 Marks)
- 2b. Describe how hydrogen sulfide is produced in sewer system and the problems it can cause. (6 Marks)
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- 3a. Describe two situations that could cause hydraulic overload in an industrial wastewater treatment collection system. (6 Marks)
- 3b. Describe the problems a hydraulic overload can cause at an industrial wastewater treatment plant. (6 Marks)
4. Explain how each of the following filter types work. (6 Marks)
- (a) downflow and (6 Marks)
 - (b) upflow. (6 Marks)
5. Compare and contrast slow sand and rapid sand filters. (12 Marks)
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- 6a. Explain distillation process. (3 Marks)
- 6b. What is reverse osmosis? (3 Marks)
- 6c. Compare these two methods in terms of their capabilities and cost effectiveness. (6 Marks)
- 7a. What are the chemicals normally removed from waste of fertilizer industry? (4 Marks)
- 7b. Why should these chemicals be removed and not released into the natural water systems? (4 Marks)
- 7c. What are the natural processes disrupted if these chemicals are present in the natural water after waste treatment? (4 Marks)
8. Select one of the following industries and describe the characteristics of the wastes they generate and the possible treatment requirements. (6 Marks)
- a. paper and pulp industry (6 Marks)
 - b. petroleum refining industry

Register Number:

9022

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2005

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

**ENVC-202. DESIGN OF WATER AND WASTE
WATER TREATMENT PLANTS**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

***Answer any FIVE questions
All questions carry equal marks***

1. A settling tank is designed for an overflow rate $120 \text{ m}^3 / \text{day} / \text{m}^2$. The tank is receiving the discrete particles of size 0.04mm and specific gravity 2.65. The kinematic viscosity of water is 1.007 centistokes. What percentage of particles will be removed in this tank?
 2. Describe a mixing basin with baffles of round the end type for treating 20 mld of water. Assume detention period as 30 min and average flow velocity as 0.30 m/s.
 3. Obtain the dimensions of a mixing unit, flocculation unit and sedimentation unit for treating 7.5 mld of water. Assume suitable data for your design. Check for important design criteria.
- 2
4. Design a set of rapid sand filters for a population of 1,00,000 with an average water demand of 1.50 l pcd. Assume suitable filtration rate for your design. Also design the underdrainage system for the above filter units.
 5. Design a standard rate trickling filter for the following data:
Average rate of flow = 5mld; 5 day BOD of the influent = 200 mg/l; organic loading for the filter = 160 gm/m³/day; hydraulic loading rate = 25 million liters/ hectare / day
 6. Write the details regarding the design considerations involved in an activated sludge plant.
 7. Design a sludge digestion tank for a population of 50000. The per capita contribution of sludge is 0.05 kg/day. The moisture content of the sludge is 95%. The specific gravity of the wet sludge is 1.02 and 4% of the digester volume is daily filter with fresh sludge which is mixed with digested sludge.
 8. Write the details regarding design of pressure filters and rotating biological contactors.
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Register Number:

9023

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2005

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

**ENVC-203. ENVIRONMENTAL IMPACT
ASSESSMENT**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

*Answer any FIVE questions
All questions carry equal marks*

(5 × 12 = 60)

1. Explain the various impacts resulting from laying a national highway.
2. What are the potential impacts on Ecological environment due to development of thermal power station?
3. a) Discuss the national ambient air quality standards in detail. (6)
b) Explain how will you express the ppm units in $\mu\text{g}/\text{m}^3$. (6)
4. Discuss any twelve important parameters under any two Indian standards for disposal of treated industrial waste.
5. Explain the various baseline data. You will collect on soil and water environment.
6. What are the various features of ISO 14000? Explain in detail.
7. What are the various EIA aspects to be considered regarding disposal of hazardous wastes like hospital wastes: Explain.
8. Write short notes on:
 - a) Impact assessment methodologies
 - b) Significance of Public participation
 - c) Life cycle analysis.

M.E. DEGREE EXAMINATIONS, 2005

ENVIRONMENTAL ENGINEERING

SECOND SEMESTER

ENVC- 204. SOLID WASTE AND
HAZARDOUS WASTE MANAGEMENT
(Common with Part-time)

Time: 3 Hours

Maximum: 60 Marks

May)

Answer any FIVE full Questions
All Questions carry equal marks

- 1.a. What are the goals and objectives of solid waste management? 3
 - b. Explain in detail about the various collection systems with neat sketches 9
 2. Discuss in detail about the compaction and grinding. Compare their merits and demerits
 - 3.a. Discuss the incineration of solid waste in terms of cost considerations 3
 - b. What are the air pollution problems arise due to incineration of solid waste and how it will be controlled? 9
 4. List the environmental problems due to sanitary landfill? What are the facilities and machineries required to control the problems?
 5. Elaborate the EIA procedure to be adopted in selecting a landfill site
 6. Write short notes on 9
 - a. Recovery and reuse of solid waste 3
 - b. Ocean Disposal
 - ~~7.a. What are the sources of hazardous waste? 3~~
 - b. Explain the important characteristics of hazardous waste. Discuss the TCLP test procedure 9
 8. List the various hazardous waste treatment techniques. Explain any one in detail
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M.E. DEGREE EXAMINATION, 2005

ENVIRONMENTAL ENGINEERING
SECOND SEMESTER

ENVC-205 ENVIRONMENTAL MANAGEMENT
(Common with Part-time)

Maximum: 60 Marks

Time: 3 Hours

May)

Answer any FIVE questions
All questions carry equal marks

1. a. Explain the application of cost benefit analysis in environmental problems (6)
b. What are the aims and objectives of environmental management? (6)
2. What are effects of environmental pollution on socio-economic aspects? How the environment can be protected?
3. Elaborate the various techniques of water quality management and monitoring programmes
4. Discuss about the air quality management with a neat sketch.
5. What are the problems encountered in solid waste dumping, discuss in particular about the air pollution problems and how this can be rectified?
6. Explain in details about Environmental Protection Act.
7. How environmental audit is done? How the audit results are evaluated?
8. Write short notes on Life cycle analysis and Areas to be avoided for siting industries

Register Number:

9026

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2005

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

ENVE-206. AIR QUALITY MONITORING AND MODELLING

(Common with Part Time)

(Elective)

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE full questions

All questions carry equal marks

(5 × 12 = 60)

1. Explain the functioning of stack gas monitoring system with sampling train with neat sketch.
2. Explain the functioning of ambient air quality monitoring system for particulates and gaseous pollutants with sketch.
3. Explain the method of SO₂ & NO_x determination in gaseous samples.
4.
 - a) Explain the significance of isokinetic sampling during source sampling. (6)
 - b) Recommend the minimum stack height for an industry which emits particulates at 1.45 kg / hr and SO₂ at 5 kg / hr. Also discuss the CPCB guidelines for minimum stack height for different industries. (6)

5. Explain the various assumptions behind formulation of a dispersion of models used for elevated point **sources and line source and their limitations.**
6. a) Explain how will you estimate the average stack gas velocity. (4)
b) Explain the significance of location of sampling ports and fixing number of sampling points? (4)
c) Explain micro – meteorology factors affecting air quality. (4)
7. a) Discuss the effect of lapse rate on plume behaviour. (6)
b) Explain the various sources of air emissions and also explain the significance of emission inventory. (6)
8. a) Estimate the SO₂ level for the following case study for a thermal power plant. Coal consumption: 2.4 mt/day; sulphur content 4.2%; effective stack height : 300 m ; wind speed at stack height = 4.5 m/sec; Receptor location; 850 m downwind direction; the existing ambient SO₂ concentration = 10 microgram/m³ ($\sigma_y=55m$; $\sigma_z=34m$). (8)
b) Write short notes on wind rose construction. (4)
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Register Number:

6221

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2007

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

**ENVC-201. INDUSTRIAL WASTE WATER
TREATMENT**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

1. Describe the possible adverse impacts that industrial wastewater discharges can have on each of the following:
a) Wastewater collection system (6)
b) Groundwater aquifer (6)
2. Describe the effects of pH extremes on a wastewater collection system. Explain why flammables are a concern in a wastewater collection system. (12)
3. What is the pollutant being measured by BOD? How does this pollutant if present in water affect the biolife in the water? (12)
4. Why is filtration needed after sedimentation? List the factors affecting performance of a rapid sand filter. Explain the design procedure of rapid sand filter. (12)
5. Discuss about aerobic and anaerobic treatment processes. (12)
6. Describe reverse osmosis membrane filtration processes. What are membranes made from? What factors determine the level of wastewater component concentration in a membrane filtration system? (12)
7. Select one of the following industries and describe the characteristics of the wastes they generate and the possible treatment requirements.
a) Textile industry (6)
b) Tannery industry (6)
8. Describe how the metal plating process generates and discharges to an industrial sewer. (12)

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6223

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2007

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

**ENVC-203. ENVIRONMENT IMPACT
ASSESSMENT**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

1. Explain the various legal aspects of conducting EIA for an industry.
2. How will you conduct Socio-Economic survey for an EIA Study?
3. Explain how will you predict and assess impacts of Noise for an Automobile Industry.
4. How will you assess the impacts on Biological environment?
5. Explain the various methods of ranking Project alternatives.
6. Explain the various features of ISO 14000 in details.
7. Explain the significance of Public Participation in EIA Process? How will you ensure such Participation?
8. How will you assess the impacts on Soil Water Environment due to Industrial activity?

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6225

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2007

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

ENVC-205. ENVIRONMENTAL MANAGEMENT

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

1. What are the aims and objectives of Pollution Control agency? Explain the power vested with Control and State Pollution Control Boards.
2. What is meant by Effluent and Stream Standards? Explain the fixation of such standards based on Scientific data.
3. Explain the various uses of Water and Water Quality Monitoring Programmes.
4. Explain the procedure for monitoring the particulate gaseous pollutants in the ambient air.
5. Write an explanatory note on Land Pollution due to uncontrolled dumping of Solid Wastes.
6. Write the details about Code of Practice applicable to new and existing industries.
7. Explain the Methodology of Environmental auditing and evaluation of audit results.
8. Write short notes on
 - (i) Common Effluent Treatment Plant
 - (ii) Categories of penalties for protecting the Environment
 - (iii) Cost benefit analysis of Environmental problems.

Register Number:

6471

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-201. INDUSTRIAL WASTE WATER
TREATMENT**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

All questions carry equal marks

1. a) State why Industrial Waste Water treatment is necessary?
- b) Discuss briefly about affect of Industrial Wastes on the quality of environment.
2. a) What do you mean by toxic wastes? How are they classified by the Indian Regulatory authority?
- b) Describe the effect of Industrial Waste Water on Municipal Sewage treatment plants.
3. Explain in detail how Process Modifications and Byproduct recovery reduce strength of Waste from Industries.
4. a) Explain how neutralization of acid Waste and alkaline Waste are carried out in Industries.
- b) What do you mean by "Proportioning" and explain its application in Industrial Waste Water Treatment.
5. a) Suggest a suitable biological treatment system to treat a Sugar Mill Waste.
- b) Explain the application of anaerobic treatment system for treatment of Industrial Waste Water.
6. a) Give a suitable treatment method to remove dissolved in-organic substances from Industrial Waste Water.
- b) Explain how metals are removed from Industrial Waste effluents.
7. Write notes on the sources characteristics and methods used for treatment of Paper Mill Wastes.
8. Write the characteristics of a Petroleum Refinery Waste Water and describe the methods to treat the same.

Register Number:

6472

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-202. DESIGN OF WATER AND WASTE
WATER TREATMENT PLANTS**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

Assume any necessary data suitably

All questions carry equal marks

1. The maximum daily demand at a water purification plant has been estimated as 12 million liter/day. Design the dimensions of a suitable sedimentation tank for the raw supplies assuming a detention period of 6 hours and the velocity of flow as 20-cm/min.
2. Design a coagulation-cum-sedimentation tank with continuous flow for a population of 60,000 persons with a daily per capita water allowance of 120lt. Make suitable assumptions where needed.
3. From clear water reservoir 3 m deep and maximum water level at 30.00, water is to be pumped to an elevated reservoir at 75.00 at the constant rate of 9-lakh liter/hour. The distance is 1500 m. Give the economical diameter of the rising main and the water horsepower of the pump. Neglect minor losses and take $f=0.01$.
4. Design a clariflocculator to treat $250\text{m}^3/\text{hour}$ of water. Assume necessary data suitably.
5. A filter unit is $4.5\text{m}\times 9.0\text{ m}$. After filtering $10000\text{m}^3/\text{day}$ in 24 hours period, the filter is back washed at a rate of 10liter/sq m/sec for 15 min. compute the average filtration rate, quantity and percentage of treated water used in back washing and the rate of wash water flow in each trough. Assume 4 troughs.
6. The sewage is flowing at 4.5MLD from a clarifier to a trickling filter. The 5-day BOD IS 160mg/l. the value of the organic loading is 160-gm/m³/day and surface loading 200l/m²/day. Determine the volume of the filter and its depth. Also find efficiency of the trickling filter.
7. The MLSS concentration in an aeration tank is 2500mg/l and the sludge volume after 30 min of settling in a 1000ml graduated cylinder is 215 ml. Calculate SVI, Return sludge ratio, SS concentration in the recirculated sludge.
8. Design an oxidation pond for treating sewage from a hot climatic residential colony with 5000 persons contributing sewage at 120lpcd. The 5-day BOD of sewage is 300mg/l.

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6473

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-203. ENVIRONMENTAL IMPACT
ASSESSMENT**

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

*Answer any FIVE questions.
All questions carry equal marks*

1. Explain how you would assess Environmental Impacts due to major construction activity like Dams.
2. How will you describe the Environmental Setting of an affected Environment?
3. How will you predict and assess the impacts on the Air Environment?
4. What are the various Legal aspects of EIA for setting up of an Industry?
5. How will you conduct Socio-economic Survey for an EIA Study?
6. Explain the various methods for ranking alternatives.
7. Explain the various features of ISO 14,000 in details.
8. How will you predict and assess the impact on Soil and Ground Water Environment?

Register Number:

6474

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-204. SOLID WASTE AND HAZARDOUS
WASTE MANAGEMENT**

(Common with Part Time)

May)

(Time: 3 Hours

Maximum: 60 Marks

*Answer any FIVE questions
All questions carry equal marks*

1. What are the objectives of solid Waste Management? Distinguish between Garbage and Rubbish. Give examples.
2. 'Segregation and Separation of Waste at source is the best Solid Waste Management'-Comment on the statement.
3. Explain briefly the Optimization route of collection in Solid Waste Management.
4. What are the methods by which disposal of Solid Waste Undertaken? Any two methods in details.
5. What is meant by Leachate? What are the characteristics of the Leachate from a Municipal Solid Waste Dump? What are the impacts of Leachate? How it is prevented?
6. Explain in detail the impact of improper solid Waste Management in the Environment.
7. What is meant t by Hazardous Waste? Distinguish between Toxic Waste and Hazardous Waste. Suggest an action to contain any one Hazardous Waste.
8. Write short notes on:
 - i) Recovery and reuse in solid Waste Management.
 - ii) Recent Amendment of Environmental Protection Act relating to Hazardous Waste Management.
 - iii) Vector Control in Solid Waste Management Site.

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6475

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-205. ENVIRONMENTAL MANAGEMENT

(Common with Part Time)

May]

[Time : 3 Hours

Maximum : 60 Marks

*Answer any FIVE questions.
All questions carry equal marks*

1. What are the agencies responsible for the implementation of Environmental Laws? Explain their activities in implementations.
2. How polluter pollutes the atmospheric air and land? By way of fixing standards how we are protecting our environment.
3. How air quality survey is conducted in an area? How you correct the violation?
4. What are the problems associated with Solid Waste Management? What are the engineered control measures for the Management of Solid Waste?
5. What are the Penalties categorized for the violators in Environmental Management?
6. Describe the Codes of Practices applicable for New Industries.
7. What are the aims of Auditing? What are the components of in the Audited Reports? Explain their importance.
8. How the Planners are responsible for safeguarding our Environmental?

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5922

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2005

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

**ENVC-202. DESIGN OF WATER AND
WASTEWATER TREATMENT PLANTS**

(Common with Part Time)

November]

[Time : 3 Hours

Maximum : 60 Marks

(5 × 12 = 60)

Answer any FIVE questions

1. Design a screen chamber for a population of one lakh with per capita water supply as 135 lpcd. The bar racks may be designed with bar diameter facing the flow as 36mm and clear opening 9mm, Angle of inclination as 45°. Check for head loss in the screen.
2. Determine the maximum displacement velocity, without the condition of settled particles being lifted up and the ratio of length to the depth of the settling unit for the following particles.
 - a) alum floc having $S_s = 1.15$ and diameter 0.08cm and
 - b) anthracite coal dust having $S_s = 1.6$ and diameter = 0.008 cm. Assume $f = 0.025$ and temperature of basin = 20°C.
3. Design a coagulant aided sedimentation tank to treat 16 MLD of raw water. Assume suitable data wherever necessary.
4. Design a slow sand filter system for a town having population of 20000 with an average water supply rate as 70 lpcd. Assume missing data wherever necessary.
5. Two particle size distribution of the stock sand to be used is given below

| Size of sand, mm | 0.15 | 0.2 | 0.3 | 0.45 | 0.6 | 1 | 2 |
|------------------|------|-----|-----|------|-----|----|----|
| Percent finer % | 1 | 5 | 11 | 21 | 36 | 68 | 93 |

The desired effective size of filter sand is 0.5mm and the uniformity co-efficient is 1.5. Determine the diameters of the finer and coarser particles that are required to be removed from the stock sand.
6. Design a high rate trickling filter to treat settled domestic sewage having BOD of 210 mg/l for an average flow of 20 MLD to satisfy an effluent BOD of 20 mg/l. Assume the missing data suitably.
7. Design a conventional activated sludge plant to treat settled domestic sewage with diffused air system with the following data.

| | |
|---------------------------------|------------|
| Population | = 100000 |
| Per capita sewage flow | = 135 lpcd |
| Settled sewage BOD ₅ | = 210 mg/l |
| Effluent BOD ₅ | = 15 mg/l |
8. State reasons for the following:
 - a) Slow sand filter is not effective when turbidity is more than 20 NTU.
 - b) Recirculation of either effluent or sludge in biological treatment process.
 - c) Necessity of settling tank in biological treatment units.
 - d) Maintenance of lower level of dissolved oxygen in activated sludge process aeration tank.

M.E. DEGREE EXAMINATION, 2007

(ENVIRONMENTAL ENGINEERING)

SECOND SEMESTER

ENVC-204. SOLID WASTE AND HAZARDOUS WASTE MANAGEMENT

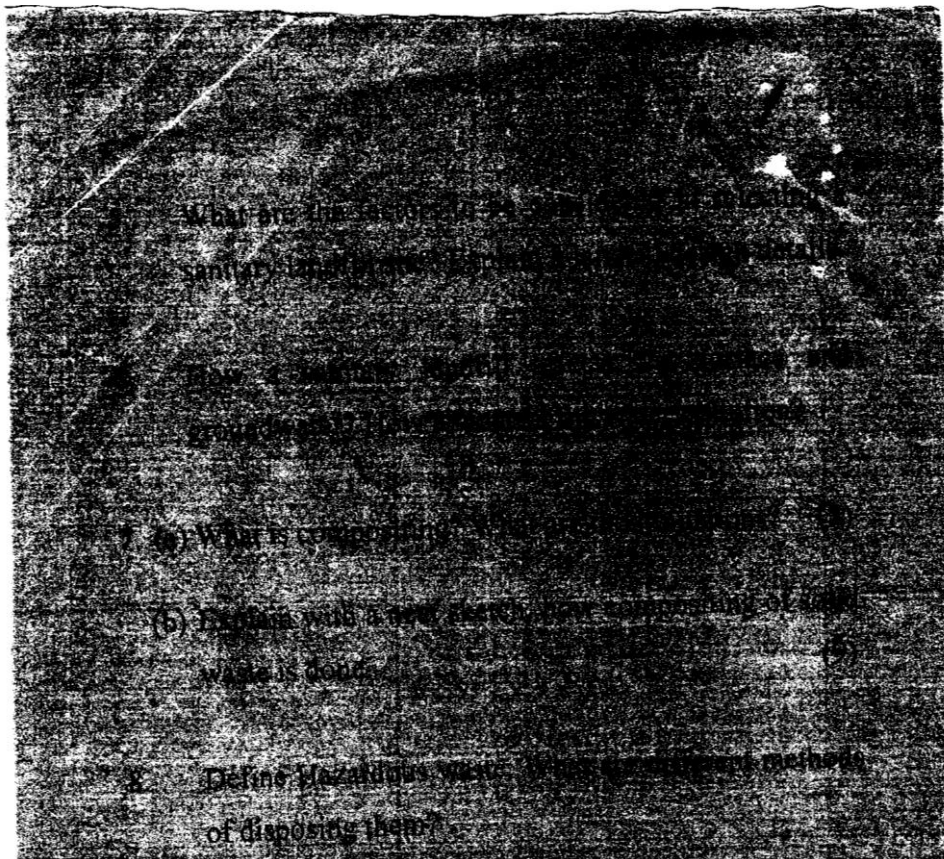
(Common with Part Time)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

1. (a) Explain the various environmental problems due to solid waste generation. (3)
- (b) Describe the various types of solid waste. Give the typical values of solid waste characteristics for Indian condition. (9)
2. (a) What is transfer station? What are its functions? (3)
- (b) Explain the environmental problems arise due to solid waste transport. On what basis a collection route will be selected. (9)
3. Discuss the various volume reduction methods.
4. With a neat sketch explain the incineration of solid waste. List the advantages and disadvantages of using incinerators.



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3539

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-201.INDUSTRIAL WASTE WATER TREATMENT

(Common with Part Time)

Nov)

(Time: 3 Hours

Maximum: 60 Marks

*Answer any FIVE questions
All questions carry equal marks*

1. a) Describe the characteristics of Industrial Waste Water and how it is different from Domestic Waste Water.
b) Explain the effect of BOD and suspended solids on Sewage Treatment Plant.
2. a) What do you mean by Refractory Organics and what are the industries likely to discharge waste water containing the above Materials?
b) Explain a method of removal of refractory organics from Industrial Waste Water.
3. Explain in detail the waste reduction and minimization methods, adopted at source.
4. a) Explain the following:
i) Equalization and ii) Neutralization
b) Describe in detail with sketch the dispersed air Flootation phenomenon.
5. Why do we resort to aerobic technologies in Industrial Waste Management? List down the relative advantages and disadvantages of aerobic reactors over Anaerobic Reactors.
6. a) Mention the application of membrane technology.
b) Enumerate the classification of membrane process.
c) Write in detail the membrane operation with a neat sketch.
7. a) Write the sources and characteristics of Waste Water from a Dairy Industry.
b) Explain with a flow diagram, the treatment of Dairy Wastes.
8. a) Explain ill effects of tannery effluent on the sewers and on treatment Plant when it is discharged without treatment.
b) Give the characteristics of Metal finishing industrial Waste Water and explain how they are treated.

Register Number:

6476

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVE-206. AIR QUALITY MONITORING AND
MODELLING**

(ELECTIVE)

(Common with Part Time)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions.

1. a) What is meant by Air Sampling? (4)
b) What systems are adopted for Sampling?
Explain in detail? (8)
2. a) Write a note on Ambient Air Quality Standards
and Emission Standards. (6)
b) Discuss the factors influencing selection of
Sampling Locations of Ambient Air Quality
Index. (6)
3. a) Explain a method to analyse CO from Ambient
Air. (6)
b) Explain the method of determination of SPM
and NOX in Ambient Air Samples. (6)
4. Explain the various features of Stack gas Sampling
train & the significance of each component. (12)
5. a) Briefly explain the effects of wind speed &
terrain roughners on pollutants dispersion. (6)
b) What is Plume rise? Discuss any two formulae
available for the computation of plume rise. (6)
6. A 1000 MW power plant burns coal 5.45t per hour
which has 3% sulphur content. The effective stack
height is 75m. The wind velocity at stack height is
6m/s. The atmospheric condition is moderately to
slight stable. Determine the maximum ground level
concentration of SO² and the distance from the stack
at which maximum occurs. (12)
7. Explain how will you construct wind rose diagram
for a location. (12)
8. Explain (i) Dry adiabatic lapse rate. (4)
(ii) Chemical reactions occurring in stratosphere. (8)

Register Number:

3540

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-202. DESIGN OF WATER AND WASTE
WATER TREATMENT PLANTS**

(Common with Part Time)

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions

Assume any necessary data suitably

1. A rectangular settling tank without mechanical equipment is to treat 1.8 million liter/day of raw water. The sedimentation period is to be 4 hours; the velocity of flow 8 cm /min and the depth of the water with sediment is 4.2m. if an allowance of 1.2m for sediment is made what should be [i] the length of the basin [ii] the width of the basin.
2. Design the water depth for a mixing basin having around the end baffles in order to treat 48 million liter/day of water. Assume the tank is divided into two compartments each of width 8m. Assume suitable detention time and flow velocity. The clear distance between the baffles may be kept as minimum. Mention the number of channels in the tank and also the over all inside length of the tank.
3. A centrifugal pump driven by an electric motor lifts water through a total height of 50 m from the reservoir to the discharge end. The pump efficiency is 77% and the motor efficiency is 85%. The lift is through 300m length of 10cm diameter pipe and the pumping rate is 1500liter/min. If f is 0.025 and power costs Rs1.25/kW hour, what is the cost of power for pumping 4 million liter of water.
4. Calculate the important dimensions of a mixing unit, flocculating unit and settling tank to treat a design discharge of 13 million liter/day.
5. Design a water treatment unit with out any pretreatment for town of population 75,000 whose percapita demand is 135lpcd quality of water should be in potable condition assume rate filtration as 210lt/hr/m².
6. Determine the size of a high rate trickling filter for the following data Sewage flow=4.5MLD; recirculation factor =1.8; BOD of raw swage =250mg/l; BOD removal in primary tank =25%; final effluent BOD desired=50ppm.
7. Design a conventional activated sludge plant to treat domestic sewage with diffused air aeration system with the following data. Population=35000, average sewage flow=180lpcd, BOD sewage =220mg/l, BOD removal in primary tank =30%, overall BOD reduction =85%. FM ratio=0.35, MLSS=2000mg/l. Verify any two conditions for design limits.
8. A sedimentation tank is treating 4.5 million liters of sewage /day containing 275 ppm of suspended solids. The tank removes 50% of suspended solids. Calculate the quantity of sludge produced per day in bulk and weight if [a] moisture content of sludge is 98%.

Register Number:

3541

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-203. ENVIRONMENTAL IMPACT
ASSESSMENT**

(Common with Part Time)

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions

1. Distinguish between aspect and impact. Prepare aspect-impact chart for a construction of 5 storey building.
 2. What is meant by Environmental indices? How are they involved out? How are they useful in describing the affected environment?
 3. What is meant by socio-economic impact of a project? Present your answer with suitable examples?
 4. Explain how mathematical models can be useful tool in prediction of environmental impact?
 5. Explain the significance of check list, matrices and network in EIA studies.
 6. Assume that an IT park comes near your Institute. List down the possible positive and negative impacts of the projects? If negative impacts are weighed more suggest the mitigation measures.
 7. Explain how environmental sustainability is disturbed with regard to eco diversity, flora and fauna in a multipurpose reservoir project.
 8. Explain the role of public participation in EIA studies.
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Register Number:

3542

Name of the Candidate:

~~M.E. DEGREE EXAMINATION, 2008~~

~~(ENVIRONMENTAL ENGINEERING)~~

~~(SECOND SEMESTER)~~

**ENVC-204. SOLID WASTE AND HAZARDOUS
WASTE MANAGEMENT**

(Common with Part Time)

November]

[Time : 3 Hours

Maximum : 60 Marks

*Answer any FIVE questions
All questions carry equal marks*

- ✓ 1. Explain the impact of improper solid ^{waste} ~~work~~ management on air, land and water.
 - ✓ 2. What is meant by physical and chemical characteristics of a solid waste? Briefly explain any two parameters in each characteristics.
 - ✓ 3. What is meant by compositing? Explain with a suitable sketch, the compositing of a solid waste.
 4. What are the legal provisions in handling of solid waste? What are the precaution to be observed for safeguarding personnel health at solid waste management site?
 - ✓ 5. Distinguish between pyrolysis and incineration with a neat sketch explain the incineration of solid waste.
 6. What is meant by lines in solid waste dump? What should be its characteristics? Explain any two liver materials that are generally adopted in solid waste management.
 7. What is meant by hazardous waste? How is it defined in the Hazardous waste handling act? In what way, this is different from the definition provided by EPA, USA?
 8. Write short notes on:
 - a) Garbage and refuse
 - b) Sanitary land fill and open dumping
 - c) Energy recovery from solid waste.
-

Register Number:

3543

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2008

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-205. ENVIRONMENTAL MANAGEMENT

(Common with Part Time)

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions

1. How is cost benefit analysis useful in choosing a industrial project?
2. Name the two standards of tolerance to fix the degree of pollution. How these standards fix pollution control?
3. What are the planning approaches in protecting environment?
4. Why common effluent treatment concept is necessary for the industries in a city?
5. Ambient air quality survey is conducted in the region of air pollution. Why is this survey necessary?
6. What are problems associated with solid waste? How solid can be managed by technology transfer.
7. What the codal practice suggests for the existing industries? How environmental laws enter into force these industries?
8. How environmental audits is evaluated? Give example and explain.

Register Number:

9242

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2011

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-202. PROCESS AND UNIT OPERATIONS FOR
WASTE WATER TREATMENT**

(Common with Part-Time)

May]

[Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE Questions

1. Describe the following characteristics of waste water in detail. 1. pH 2.Solids 3. BOD 4. COD 5. Heavy Metals 6.Toxic chemicals. (12)
2. a) Describe the Neutralization & Proportioning in the waste water treatment. (6)
b) Describe the role of clarifier in waste water treatment. (6)
3. a) Differentiate the Aerobic from Anaerobic process in the waste water treatment. (6)
b) With a sketch, describe the principle and function of trickling filter in waste water treatment. (6)
4. a) What are the factors affecting the adsorption? (4)
b) Explain the role of UV radiation and Ozonation in the waste water treatment. (8)
5. List the different types of membrane technology. Explain Nano & Ultra filtration in detail. (12)
6. Describe the Incineration and Landfill methods for sludge disposal. (12)
7. Write short notes on any THREE of the following: (12)
 - a) Standards for treated effluent
 - b) UASBR
 - c) Reverse Osmosis waste water treatment
 - d) Sludge Volume Index
 - e) Filter Presses
8. Write short notes on the determination of kinetic coefficients of aerobic anoxic and anaerobic suspended growth. (12)

Register Number: 1028157B.

9241

Name of the Candidate: R. Subramaniam.

M.E. DEGREE EXAMINATION, 2011

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-201. INDUSTRIAL WASTE WATER
TREATMENT**

(Common with Part-Time)

May]

[Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE Questions

All questions carry equal marks

1. Classify the possible contribution in Industrial waste waters that can cause pollution. Briefly discuss the effects and difficulties caused by them when discharged in streams.
2. Explain the laboratory method of determining the BOD of a waste sample.
3. Mention the basic principles of design of Type-I settling and draw the sketch of a settling tank.
4. Explain the activated sludge process principles in detail.
5. With a neat sketch explain the reverse osmosis method of desalination.
6. What are the benefits of CETP? Explain any one CETP in detail.
7. With a process flow sheet mention the origin and characteristics of wastewater generated in a typical sugar Industry.
8. Write short notes on any THREE of the following:
 - a) Bio-degradables
 - b) Oil skimmer
 - c) RBC *Rotating Biological Contact*
 - d) UASBR
 - e) Extended Aeration.

9243

Register Number:

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2011
(ENVIRONMENTAL ENGINEERING)
(SECOND SEMESTER)

ENVC-203. ENVIRONMENTAL IMPACT
ASSESSMENT

(Common with Part-Time)

[Time: 3 Hours

May]

Maximum: 60 Marks

Answer any FIVE Questions

All questions carry equal marks

1. a) Give a detailed report on Environmental policy and impact assessment in India.
b) Explain risk assessment principle in EIA studies.
2. Write about various aspects in planning and management of impact studies.
3. Distinguish between high level checklist and low level checklists. Formulate a high level and low level check list for a water treatment plant for which you are asked to prepare an impact statement.
4. What is meant by environmental setting? How is it useful in EIA? Explain briefly using a case study.
5. Briefly explain how would you plan an EIA study for a proposed nuclear power plant in your area.
6. Discuss in detail about merits and demerits of public participation, objectives, identification of public, selection of public participation techniques and also techniques for conflict management and dispute resolution.
7. Write in detail about environmental impact assessment for setting up solid waste disposal site.
8. Write short notes on any THREE of the following:
 - a) Merits and demerits of check lists
 - b) Activities involved in EIA
 - c) Visual impact assessment
 - d) Environmental auditing.

M.E. DEGREE EXAMINATION, 2011

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-205. AIR POLLUTION MONITORING AND CONTROL

(Common with Part-Time)

May]

[Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE Questions

All questions carry equal marks

1. a) Describe in detail Emission standards. (6)
b) What are the Indian standards for particulate emission in the case of cement industries located in protected areas and other areas? (6)
2. a) List the various methods of sampling and describe any one in detail. (6)
b) What are the methods of collecting gas samples from a stack? Describe any one with neat sketch. (6)
3. a) Explain with neat sketch, the principle, construction and working of cyclone separator. (6)
b) Enumerate the factors on which the collection efficiency of a cyclone depends. (6)
4. a) Explain with neat sketch, the principle and construction of fabric filters. (6)
b) Explain with neat sketch, the construction and working of plate type electrostatic precipitator. (6)
5. a) List various types of scrubber and explain them with neat sketch. (6)
b) What are the merits and demerits of scrubbers? (6)
6. a) Mention the common methods of control of gaseous contaminants and describe any one of them in detail. (6)
b) Write a note on the importance of activated carbon as an adsorbent? (6)
7. a) What are the methods available to control air pollution by process changes? Describe any one by suitable examples. (6)
b) Discuss the recent development in the automobile industry to reduce air pollution. (6)
8. Write short notes on any THREE of the following: (3×4=12)
 - a) High volume air samples
 - b) Fabric filters
 - c) Cross-flow packed tower
 - d) Evaporative emissions
 - e) Air-fuel ratio

M.E. DEGREE EXAMINATION, 2013

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-206. NOISE POLLUTION AND CONTROL

10v.]

[Time: 3 Hours

Maximum: 75 Marks

(Max: 60 marks those who joined before 2011-12)

*Answer any FIVE Questions
All questions carry equal marks*

1. List and then explain the different sources of noise in the modern world. (15)
2. Explain the human hearing mechanism. Enumerate the exposure limits. (15)
3. Describe the basic *concepts of Sound* like sound propagation, sound intensity, sound power and units of sound. (15)
4. Describe the components and functional procedure of the sound level meter of any type. (15)
5. Brief about the noise generation mechanism and describe the different methods to control the noise pollution. (15)
6. a) Explain in detail the effects of noise pollution. (10)
b) If sound intensity is 60 watt/m^2 and unit area perpendicular to wave motion direction 0.5 m^2 then find out the power of sound in watt. (5)
7. Describe about the noise pollution control legislations. (15)
8. Write short notes any THREE of the following: (3x5=15)
 - a) Indoor sources of noise pollution.
 - b) Annoyance
 - c) Equivalent pressure level.
 - d) Community noise measurement.
 - e) Hearing loss due to noise.

0538

Register Number:

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2014

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-203. ENVIRONMENTAL IMPACT ASSESSMENT

May]

[Time: 3 Hours

Maximum: 75 Marks

(Max: 60 marks for those who joined before 2011-12)

*Answer any FIVE questions
All questions carry equal marks*

(5 x 15 = 75)

1. a) With the help of flow chart describe the EIA process.
b) Explain the town planning concepts.
2. a) Enumerate the methods of Risk Assessment in EIA.
b) What are the basic amenities of Educational Institutions?
3. a) Explain any three methods of determining air pollution index.
b) Write the objectives and aims of pollution control agency.
4. a) What type of industries can go in for ISO 14000 series of standards?
b) Explain various health and social objectives of pollution control.
5. Explain the interaction matrix methods of EIA.
6. a) Describe the sources and effects of air pollution.
b) Write the air quality management plan.
7. What are the different types of information to be depicted in an Environments Audit Report?
8. Write short notes on the following:
 - a) Environmental Impact assessment of hazards waste
 - b) Environmental Policy of an Industry
 - c) Objectives of Environmental statement.

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Register Number:

0539

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2014

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

(COMMON WITH PART-TIME)

ENVC-204. SOLID WASTE AND HAZARDOUS WASTE MANAGEMENT

May]

[Time: 3 Hours

Maximum: 75 Marks

(Max: 60 marks for those who joined before 2011-12)

*Answer any FIVE questions
All questions carry equal marks*

1. Explain the generation of solid wastes, composition of solid waste and legislative trends for solid waste management in detail.
2. Explain the importance of transfer and transport in solid waste management.
3. Describe any one of the following: Thermal, Biological and Chemical conversion technologies in solid waste management.
4. ~~List the different methods of volume reduction in solid waste management. Describe the compaction process.~~
5. Enumerate the factors considered for site selection to sanitary landfill method. Explain the leachate movement and ground water pollution by them.
6. Explain in detail the recovery and reuse process in solid waste management.
7. Explain the Incineration and Composting processes in solid waste disposal.
8. Write short notes on any THREE of the following:
 - a) Stabilization of Hazardous waste
 - b) Collection and separation of solid waste-Dust bins at the streets
 - c) Dust and air pollution by solid waste incineration
 - d) Hazardous waste handling methods
 - e) Nuisances caused by landfill.

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Register Number:
Name of the Candidate:

3426

M.E. DEGREE EXAMINATION, 2014

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-205: AIR POLLUTION MONITORING AND CONTROL

November]

[Time : 3 Hours

Maximum : 75 Marks
(Maximum 60 Marks for those who joined before 2011-12)

Answer any FIVE questions.
All questions carry equal marks

1. (a) Explain with neat sketch, the isokinetic method of sampling for particulate matter. (10)
(b) Write short note on harmful effects of air pollution on plants and vegetation. (5)
2. (a) Describe with neat sketch, the principle and working of cyclone used for removal of air pollutants. Also list out its merits and demerits. (10)
(b) Dust has particles with a drift velocity of 0.15 m/s. For a total air flow of 60 m/s, determine the number of $10 \times 10 \text{ m}^2$ collecting plates needed to achieve 90% removal in an electrostatic precipitator. (5)
3. (a) Describe the process of absorption. Give examples of how it would be applied in air pollution control applications. (9)
(b) Write a short note on applications of wet scrubbers. (6)
4. (a) Discuss in detail the design and operation of carbon adsorption system used for air pollution control. (10)
(b) Differentiate between granular activated carbon and activated carbon fiber with reference to air pollution control. (5)
5. (a) Name and describe the control devices (any two) developed for control of automotive emissions. (10)
(b) Write a short note on emerging air pollution control technologies. (5)
6. (a) Explain the factors and mechanisms involved in deterioration of material due to air pollution. (10)
(b) Briefly explain the biofiltration techniques used in air pollution control. (5)
7. (a) Discuss the various methods employed for controlling the emission of volatile organic compounds. (10)
(b) A high volume sampler draws air at an average rate of $2 \text{ m}^3/\text{min}$. If the measured particle concentration is $200 \mu\text{g}/\text{m}^3$ and the high volume sampler was operated for 12 hours, calculate the weight of dust on the filter. (5)
8. (a) Explain the process and types of condensation systems. (10)
(b) Write a short note on flue gas conditioning for controlling the emission of air pollutants. (5)

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Register Number:

3422

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2014

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENV - 201. INDUSTRIAL WASTEWATER TREATMENT

November]

[Time: 3 Hours

Maximum: 75 Marks

Answer any FIVE questions

1. Discuss about the organic and inorganic impurities present in industrial wastewater.
2. Why neutralization is important? Also, explain how it is achieved in industrial wastewater treatment.
3. With a neat sketch, explain the UASB reactor and its application in industrial wastewater treatment.
4. Explain how the reverse osmosis technology helps in treatment of industrial wastewater. Also, discuss its merits and demerits.
5. Draw a layout and discuss in detail the functioning of zero liquid discharge plants.
6. Explain in detail the methods of disposal of treated industrial wastewater. Also, discuss on guidelines and standards related to it.
7. Discuss the characteristics of the wastewater and with the flow sheet, explain the treatment schemes adopted for treatment of wastewater in Dairy industry.
8. Write short notes on any THREE of the following:
 - a) Data interpretation
 - b) Activated carbon
 - c) Activated sludge process
 - d) Micro filtration
 - e) MLSS.

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Ishwari

Register Number:

0540

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2014

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

(COMMON WITH PART-TIME)

ENVC-205. AIR POLLUTION MONITORING AND CONTROL

May]

[Time: 3 Hours

Maximum: 75 Marks

(Max: 60 marks for those who joined before 2011-12)

Answer any FIVE questions

All questions carry equal marks

1. a) Explain with sketch, how particle deposition and removal from the lung is influenced by the size of the particles. (10)
b) Classify air pollutants into different categories, indicating their sources. (5)
2. a) Describe with neat sketch, the principle and working of an electrostatic precipitator used for removal of air pollutants and also list its merits and demerits. (10)
b) Write short notes on technique used for filter cleaning. (5)
3. a) Enlist various types of scrubbers. Explain any two types with neat sketch. (10)
b) Discuss in brief on design variables of condenser system. (5)
4. a) Describe the process of adsorption. Give examples of how it would be applied in air pollution control applications. (10)
b) Give the differences in granular activated carbon and activated carbon fiber with reference to air pollution control. (5)
5. a) Discuss in detail the control devices (any two) developed for control of automotive emissions. (10)
b) Write a short note on types of biological air treatment system. (5)
6. a) What are the various factors to be taken into consideration before finalizing the control equipment depending on the properties of the pollutants? (10)
b) Discuss the importance of flue gas conditioning in controlling the emission of air pollutants. (5)
7. a) Fly ash particles from stack gases flowing at $14\text{m}^3/\text{s}$ are to be removed by constructing an electrostatic precipitator. Determine the plate area required to remove the particles with diameter of $0.6\ \mu\text{m}$ with 90 and 99 percent efficiency. The drift velocity of fly ash particles has been determined to be $W = 2.5 \times 10^5 dp\ \text{m/s}$. (10)
b) Write a note on methods for VOC emission control. (5)
8. a) Describe principle and working of High Volume Sampler. (10)
b) List the possible sources of loss or error in sampling for particulate matter. (5)

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0622

Register Number:

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2015
(ENVIRONMENTAL ENGINEERING)
(SECOND SEMESTER)

ENVC - 201. INDUSTRIAL WASTEWATER TREATMENT

May]

[Time: 3 Hours

Maximum: 75 Marks

Answer any FIVE questions
All the questions carry equal marks

1. Discuss the various physicochemical characteristics of industrial wastewater.
2. With a neat sketch, explain the four functional zones of a settling tank.
3. Explain how industrial wastewater treatment can be achieved using membrane bioreactors. Also, discuss its merits and demerits.
4. ~~Draw a layout and discuss in detail the functioning of common effluent treatment plants.~~
5. Discuss in detail about RO reject management systems.
6. Explain in detail the methods of disposal of treated industrial wastewater. Also discuss on guidelines and standards related to it.
7. Discuss the characteristics of the wastewater and with the flow sheet, explain the treatment schemes adopted for treatment of wastewater in tannery industry.
8. Write short notes on any THREE of the following:
 - a) Nutrients in industrial wastewater
 - b) Neutralization
 - c) Rotating biological contactor reactor
 - d) Nano filtration
 - e) Characteristics of electro plating industry wastewater.

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0623

Register Number:

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2015

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

**ENVC-202: PROCESSES AND UNIT OPERATIONS FOR
WASTEWATER TREATMENT**

May]

[Time: 3 Hours

Maximum: 75 Marks

*Answer any FIVE questions
All the questions carry equal marks*

1. Name few contaminants (atleast five) present in wastewater and list the various unit operations and processes
2. A channel-type grit chamber has a flow-through velocity of 0.29 m/s, a depth of 0.8 m and a length of 10 m. For inorganic particles with specific gravity of 2.5, determine the largest diameters particle that can be removed with 100 percent efficiency.
3. Describe a rotating biological contactor reactor. What are the advantages and disadvantages of such a reactor?
4. Explain the adsorption principle and discuss in brief the factors affecting the adsorption process in wastewater treatment.
5. Explain in detail the operation and maintenance schedule for clariflocculators.
6. Name and describe the most common methods of sludge disposal.
7. Explain the procedure for the design of a dissolved air flotation system.
8. Write short notes on the following:
 - a) Flow equalization.
 - b) Activated sludge process.
 - c) Characteristics of a good disinfectant.
 - d) Ultrafiltration
 - e) Composting of sludge.

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Register Number:

0625

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2015

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC-204: SOLID WASTE AND HAZARDOUS WASTE MANAGEMENT

(Common with Part Time)

May]

[Time: 3 Hours

Maximum: 75 Marks

*Answer any FIVE questions
All the questions carry equal marks*

1. Explain the goals and objectives of Solid Waste Management.
2. Explain the role of separation and storage system in Solid Waste Management.
3. Describe the methods of transfer and transport operations.
4. Describe the different methods of volume reduction in Solid Waste Management.
5. Enumerate the various factors affecting sanitary landfill method.
6. Explain the recovery and reuse process in Solid Waste Management.
7. What are the composting methods available in Solid Waste Management? Explain in detail.
8. Write short notes on the following:
 - a) Ocean Disposal.
 - b) Characteristics of Hazardous Waste.
 - c) Incineration.

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Register Number:

0626

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2015

(ENVIRONMENTAL ENGINEERING)

(SECOND SEMESTER)

ENVC – 205. AIR POLLUTION MONITORING AND CONTROL

May]

[Time: 3 Hours

Maximum: 75 Marks

Answer any FIVE questions

1. a) Explain with sketch how particle deposition and removal from lung is influenced by size of particle. (10)
b) Classify air pollutants and their sources. (5)
2. a) What are the Indian standards for particulate in cement industries located in protected and other areas? (7)
b) Discuss in detail emission standards. (8)
3. Explain in brief: a) Meteorological aspects. (8)
b) Day adiabatic lapse rate. (7)
4. a) Explain with neat sketch the construction and working of electrostatic precipitator. (10)
b) Discuss in detail various types of carbon absorption systems. (5)
5. a) Discuss the advantages and disadvantages of wet collectors. (5)
b) Explain in detail working of cyclone collector. (10)
6. Discuss in detail the various types of biological air treatment systems. (15)
7. Name and describe various control devices developed for control of automotive mission. (15)
8. Write short notes on:
 - a) High volume sampler (5)
 - b) VOC emission control (5)
 - c) Air Fuel ratio. (5)

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