

Register Number: 16231011

Name of the Candidate: A. Siva abirami

3627

**M.E. DEGREE EXAMINATION, 2016**

**(ENVIRONMENTAL ENGINEERING)**

**(FIRST SEMESTER)**

**ENVC-101: STATISTICS FOR ENVIRONMENTAL ENGINEERS**

November]

[Time : 3 Hours

Maximum : 75 Marks

*Answer any FIVE questions*

(5 × 15 = 75)

*Statistical tables may be provided*

- ✓ 1. a) Find Mean, Median and mode from the following data: (7)

Marks	0-4	4-8	8-12	12-16	16-20
Frequency	4	6	10	8	4

- b) Fit a straight line to the following data by using method of least square. (8)

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

- ~~2. a) The following marks have been obtained by a class of students in statistics (out of 100).~~

Paper I	45	55	56	58	60	65	68	70	75	80	85
Paper II	56	50	48	60	62	64	65	70	74	82	90

Compute the co-efficient of correlation for the above data. (7)

- b) A sample of 12 father and their eldest sons give the following data about their heights in inches.

Father	65	63	67	64	68	62	70	66	68	67	69	71
Son	68	66	68	65	69	66	68	65	71	67	68	70

Calculate the co-efficient of rank correlation. (8)

3. a) For a Cauchy population, show that a minimum variance estimator does not exist. (7)

- b) The random sample  $x_1, x_2, \dots, x_n$  is drawn from the exponential population with density function. (8)

$$f(x; \alpha, \beta) = y_0 e^{-\beta(x-\alpha)}, \alpha \leq x \leq \alpha + \beta, \beta > 0$$

$y_0$  being a constant, obtain the maximum likelihood estimators for  $\alpha$  and  $\beta$ .

4. a) A certain stimulus administered to each of 12 patients resulted in the following increases of blood pressures.

5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4

Can it be concluded that the stimulus will be in general, accompanied by an increase in blood pressure. (7)

- b) The following table given the number of aircraft accidents that occurs during the various days of the week. Find whether the accidents are uniformly distributed over the week.

Days	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
No. of accidents	14	16	8	12	11	9	14	84

(8)

5. In a feeding experiment on swirs, three rational  $R_1, R_2, R_3$  were tired. The animals put in to three classes of three each accordingly to litre in lbs in certain period.

	Class I	Class II	Class III	Total
$R_1$	4	16	10	30
$R_2$	14	18	19	51
$R_3$	3	14	7	24
Total	21	48	36	105

Analyse the data and state your conclusion.

(15)

6. Solve by simplex method

Minimize  $Z = 4x_1 - 3x_2 + 7x_3 - x_4$

Subject to  $7x_1 + 3x_2 \leq 400$

$5x_1 + 4x_3 \geq 250$

$x_1 + x_4 > 43$

$x_1, x_2, x_3$  and  $x_4$  and non-negative and now is below 20.

(15)

7. Find the initial feasible solution of the following transportation problem by Vogel's approximation method.

		Warehouse				Capacity
		W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	
Factory	F <sub>1</sub>	19	30	50	10	7
	F <sub>2</sub>	70	30	40	60	9
	F <sub>3</sub>	40	8	70	20	18
Requirement		5	8	7	14	34(Total)

(15)

8. a) The joint Probability Mass function of X and Y is given below:

x \ y	-1	1	Total
0	1/8	3/8	4/8
1	2/8	2/8	4/8
Total	3/8	5/8	1

Find the co-efficient of correlation of  $x+y$ .

(7)

- b) Obtain the equation of lines of regression from the following data:

x	1	2	3	4	5	6	7
y	9	8	11	12	11	13	14

(8)

\*\*\*\*\*

Register Number: 16231011

3628

Name of the Candidate: A. Siva abirami

**M.E. DEGREE EXAMINATION, 2016**

**(ENVIRONMENTAL ENGINEERING)**

**(FIRST SEMESTER)**

**ENVC-102: ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY**

November]

[Time : 3 Hours

Maximum : 75 Marks

*Answer any FIVE questions*

(5 × 15 = 75)

1. Discuss the reactions for the formation of photochemical smog. (15)
2. Bring out the significance of
  - i) (Dissolved oxygen)(DO) (5)
  - ii) BOD (5)
  - iii) COD (5)
3. What is the principle of AAS? How is it environmental analysis? (15)
4. Discuss in detail biodegradation of pesticides. (15)
5. Describe the structure of bacterial cell. (15)
6. Describe the soil microbiology with reference to the organisms present in soil. (15)
7. Explain the aerobic and anaerobic heterotrophic bacterial reactions and its end products occurring in waste water treatment. (15)
8. What are the water borne diseases? Discuss the causative organisms of various water borne diseases and the mode of prevention of such diseases. (15)

\*\*\*\*\*

Register Number: 16231011

Name of the Candidate: A. Siva - abirami

3629

M.E. DEGREE EXAMINATION, 2016

(ENVIRONMENTAL ENGINEERING)

(FIRST SEMESTER)

ENVC-103. AIR POLLUTION METROLOGY AND DISPERSION  
MODELLING

November]

[Time : 3 Hours

Maximum : 75 Marks

*Answer any FIVE questions  
All questions carry equal marks*

(5 × 15 = 75)

- ✓ 1. Discuss in detail the effects and damage caused by air pollution.
- ✓ 2. Explain in detail various types of sampling methods.
3. Explain in detail the lagrangian similarity theory for stratified surface layer.
4. Explain in detail the absorption sampling and condensation sampling for gaseous air pollutants.
- ~~5. Compare plume behavior under different conditions of atmospheric stability.~~
6. Discuss in detail the applications of K theories to atmospheric dispersion.
- ✓ 7. Explain in detail regional air quality models and its applications.
8. Write short notes on
  - a) Air quality cycles. (7½)
  - ✓ b) Atmospheric stability. (7½)

Register Number: 16231011

Name of the Candidate: A. Siva abirami

3600  
0821

**M.E. DEGREE EXAMINATION, 2016**

**(ENVIRONMENTAL ENGINEERING)**

**(FIRST SEMESTER)**

**ENVE – 104: PROCESSES AND UNIT OPERATIONS FOR WATER TREATMENT**

*(Common with Part-time)*

Nov  
May

[Time : 3 Hours

Maximum : 75 Marks

*Answer any FIVE questions*

(5 × 15 = 75)

1. Briefly explain the physical and chemical characteristics of water with latest Indian Standards. (15)
2. Briefly explain the following for the turbidity and bacteriological analysis.
  - a) Jackson's turbidimeter. (3)
  - b) Baylis turbidimeter. (4)
  - c) Nephelometric turbidimeter. (4)
  - d) MPN index. (4)

---

3. Discuss briefly the theory of sedimentation. (15)
4. Explain the design parameters for the treatment of water and its influence on Primary treatment. (15)
5. Briefly differentiate the slow filter, rapid sand filter and pressure sand filter. (15)
6. Briefly explain the principles of disinfection (Chlorination) and alternate disinfection methods. (15)
7. Discuss briefly about the theory of following terms:
  - a) Reverse osmosis. (5)
  - b) Nano filtration. (5)
  - c) Ultra filtration. (5)
8. Explain the operation & maintenance processes of clariflocculators and membrane based plants. (15)

\$\$\$\$\$\$

Register Number: 16231011

3619

Name of the Candidate: A Siva abirami

M.E. DEGREE EXAMINATION, 2016

(WATER RESOURCES ENGINEERING MANAGEMENT)

(FIRST SEMESTER)

ENVC-105 / WREC-204: PIPELINE ENGINEERING

(Common with Environmental Engineering)

November]

[Time : 3 Hours

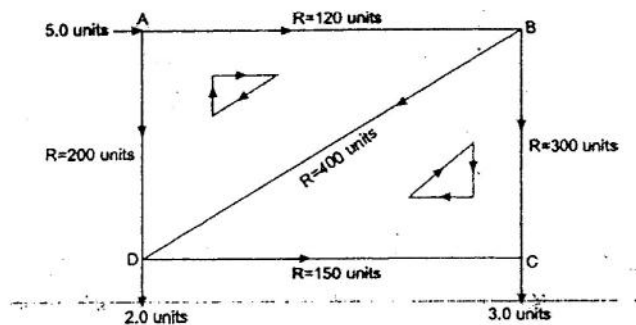
Maximum : 75 Marks

Answer any FIVE questions

(5 × 15 = 75)

Use of Hazen William chart Permitted

1. The hydraulic gradient of two points A and B in a distribution system are 48 and 45m respectively. Flow through the section is 2000 litres per minute and the distance between them is 3000 m. Using Hazen Williams formula and assuming c value 120, calculate the diameter of pipe.
2. A pipe network with two loops is shown in figure. Determine the flow in each pipe for an inflow of 5 units at the junction A and outflows of 2.0 units and 3.0 units at junctions D and C respectively. The resistance R for different pipes are shown in the figure.



3. Discuss briefly the various classifications of nodes and its applications.
4. State the various methods of detecting and prevention of wastage of water. Enumerate the causes of such wastage.
5. Discuss in detail hydraulic grade line and the total energy line.
6. Discuss in detail the water quality modeling and its applications.
7. Why chlorine is used in disinfectant in municipal water treatment and discuss the methods of applying the chlorine dose for water supply.
8. Write short notes on pipes in series, pipes in parallel and compound pipes.

\*\*\*\*\*

Register Number: 16231011

3631

Name of the Candidate: A. Siva abirami

**M.E. DEGREE EXAMINATION, 2016**

**(ENVIRONMENTAL ENGINEERING)**

**(FIRST SEMESTER)**

**ENVE-106: ENVIRONMENTAL BIO-TECHNOLOGY**

(Elective)

November]

[Time: 3 Hours

Maximum: 75 Marks

*Answer any FIVE questions*

(5×15=75)

*Draw neat sketch if needed*

*Use SI units*

1. a) Explain the mechanism of detoxification with a neat flow diagram and example. (7½)
- b) Explain the Degradation of high concentrated toxic pollutants with an example. (7½)
2. Write short notes on: (3×5=15)
  - a) Bio remediation.
  - b) De hlogenation
  - c) Bio -fertilizers
3. a) Write briefly about the Biotechnological remedies for environmental pollution. (12)
- b) What is meant by decontamination of groundwater systems? (3)
4. Discuss briefly about biogas technology with a neat sketch. (15)
5. Explain the DNA replication process. (15)
6. Discuss briefly about the distribution of microorganisms in air and soil. (15)
7. Explain the principle of bioassay test, Discuss the role of toxicity response relationship for biomonitoring of aquatic streams. (15)
8. Write short notes on: (3×5=15)
  - a) Risk assessment
  - b) IPR
  - c) Microbial containment

\*\*\*\*\*