

ENROLLMENT NO.

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M.TECH. (EEM)
1st YEAR, 2nd SEMESTER EXAMINATION
UNIT OPERATIONS & PROCESSES

[Time: 3:00 Hrs.]

Max. Marks:70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS**QUESTION NO. 1: ATTEMPT ANY TWO PARTS.****(2*7=14)**

- a) Explain the concept "Gas Transfer" in water purification process.
- b) Explain the Mass transfer model of operations.
- c) What is quicklime and what are its uses?

QUESTION NO. 2: ATTEMPT ANY TWO PARTS.**(2*7=14)**

- a) Describe the followings—
 - I. Nitration
 - II. Polymerization
 - III. Membrane processes
 - IV. Absorption
- b) Explain the term activated sludge process. Mention the advantages and disadvantages of this system.
- c) Describe the concept of adsorption and its applications in water purification systems.

QUESTION NO. 3: ATTEMPT ANY TWO PARTS.**(2*7=14)**

- a) Discuss with the help of neat diagram the treatment of sewage by this process.
- b) Explain the phenomenon of ion exchange and its functional role.
- c) A circular primary clarifier is to be designed for a municipal wastewater treatment plant having an average flow of 1.5 MGD; during the maximum flow during the day, the flow rate is 2.6 times the average hourly flow. Pertinent data are overflow rate based on average daily flow = 800 gal/day-ft², and overflow rate based on peak hourly flow = 1800 gal/day-ft². The minimum depth = 10 ft. Determine:
 - 1. The diameter of the tank.
 - 2. The design diameter of the tank if sludge rake equipment is available in 5-ft increments in diameter.

QUESTION NO. 4: ATTEMPT ANY TWO PARTS.**(2*7=14)**

- a) Define types and unit operations give classification of Unit operation and explain any one?
- b) Describe the followings—
 - I. Adsorption
 - II. Crystallization
- c) Explain the uses of unit operation processes in Sugar industry.

QUESTION NO. 5: ATTEMPT ANY TWO PARTS.**(2*7=14)**

- a) Mention the difference between unit operation and unit process with appropriate example?
- b) Explain the term activated sludge process. Discuss with the help of neat diagram the treatment of sewage by this process. Mention the advantages and disadvantages of this system.
- c) What are the phenomenon applied to design clarifiers in industries?

12/05/23

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(A) (SVSU:2022-2023/R)

ENROLLMENT NO.

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M.TECH. (EEM)

1st YEAR, 2nd SEMESTER EXAMINATION

INSTRUMENTATION (SPECTROPHOTOMETRY & CHROMATOGRAPHY)

[Time: 3:00 Hrs.]

Max. Marks: 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS

QUESTION NO. 1: ATTEMPT ANY TWO PARTS.

(2*7=14)

- What are the applications of spectrometry?
- Describe the High Performance Thin Layer Chromatography in detail?
- Explain the principles of AAS (Atomic Adsorption spectrometry)

QUESTION NO. 2: ATTEMPT ANY TWO PARTS.

(2*7=14)

- I have prepared 0.5 gr of sample in 8 ml and then dilution 5 ml in 50 ml. Sample results in AAS 16.9 concentration. What is concentration of sample in AAS.
- Explain any two-
 - GLC
 - HPLC
 - TLC
- Explain the functions and basic components of photodiode array detector.

QUESTION NO. 3: ATTEMPT ANY TWO PARTS.

(2*7=14)

- What is the difference between the UV spectrometry and IR spectrometry?
- A solution of Tryptophan has an absorbance at 280nm of 0.54 in a 9.5cm length cuvette. Given the absorbance coefficient of Tryptophan is 6.4×10^3 L/Mol/cm. What is the concentration of solution?
- Define the principle and types of chromatography.

QUESTION NO. 4: ATTEMPT ANY TWO PARTS.

(2*7=14)

- What do you understand by different types of mass detectors?
- What is the difference between Paper chromatography and Thin layer chromatography
- Explain the difference between Electrophoresis and Spectrometry.

QUESTION NO. 5: ATTEMPT ANY TWO PARTS.

(2*7=14)

- Explain the principle of Raman Spectroscopy. Discuss the application of this analytical tool in analysis of samples.
- What is visible spectroscopy? Explain its working principle and significance.
- Define FTIR in detail.

16/05/23

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(B) (SVSU:2022-2023/R)

ENROLLMENT NO.

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M.TECH. (EEM)
1st YEAR, 2nd SEMESTER EXAMINATION
SOLID & HAZARDOUS WASTETREATMENT

[Time: 3:00 Hrs.]

Max. Marks:70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS**QUESTION NO. 1: ATTEMPT ANY TWO PARTS.**

(2*7=14)

- a) Attempt the following.
- i) Problems associated waste collection.
 - ii) Sustainable Waste Management
- b) Write the detail note on waste minimization.
- c) Explain the salient provisions of the Municipal Solid Wastes (Management and handling Rules) 2000, indicating their limitations.

QUESTION NO. 2: ATTEMPT ANY TWO PARTS.

(2*7=14)

- a) Explain the need for transfer operation and design requirements.
- b) Define the design and operation of landfills occurrence and movement of gases and leachates in landfills.
- c) Explain biohazard remediation process in detail?

QUESTION NO. 3: ATTEMPT ANY TWO PARTS..

(2*7=14)

- a) What are the various sources of plastic waste? Discuss various problems related to plastic wastes with special emphasis on Indian scenario.
- b) Describe the biomedical waste and hazardous waste with respect to category; treatment and disposal also differentiate both of them.
- c) Discuss about the importance of public involvement and participation in SWM.

QUESTION NO. 4: ATTEMPT ANY TWO PARTS.

(2*7=14)

- a) Describe the impacts due to improper disposal of solid wastes on human and environment health.
- b) What are recycling and fuel-blending?
- c) Define solid waste? Describe its characteristics. Discuss the issues on solid waste management in a metropolis of over 10 million populations.

QUESTION NO. 5: ATTEMPT ANY TWO PARTS.

(2*7=14)

- a) A landfill area of (150 m x 100 m) is available for handling 25 years' municipal solid waste (MSW) for a town of 5,00,000 people. Out of the total landfill area only 80% is actually available for land fill and other is used for auxiliary services. Assuming that average per capita MSW discard per year in town is 0.05 tonne, landfill density is 500 kg/m³, and that the 15 percent of the actual landfill cell volume is used for soil cover, estimate (a) the landfill lift in one year. (b) number of years for which the land fill can be used if the landfill can't be increased beyond 25 m.
- b) Describe the Biomedical (Management and Handling) Rules, 2008. Explain the term 'colour coding' as is used in relation to the biomedical waste, and how does it help in safe disposal of bio-medical wastes.
- c) Differentiate waste prevention and waste reduction.

ENROLLMENT NO.

[illegible]

M.TECH. (EEM)
1st YEAR, 2nd SEMESTER EXAMINATION
WATER & WASTE WATER TREATMENT

[Time: 3:00 Hrs.]

Max. Marks:70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS

QUESTION NO. 1: ATTEMPT ANY TWO PARTS.

(2*7=14)

- a) Attempt any two of the following
- I. Aerated lagoons
 - II. Trickling filter
 - III. Oxidation ditches
- b) How Up flow anaerobic sludge blanket (UASB) work? Explain process with diagram.
- c) What is sludge? Discuss techniques used for Sludge Treatment & Disposal.

QUESTION NO.-2: ATTEMPT ANY TWO PARTS.

(2*7=14)

- Write the name of the most important type of species involved in the degradation of organic matter in the case of activated sludge process?
- The following flows were recorded for the month of. September-120.8MG, October-136.4MG, November-156.1MG. What was the average flow for this three month period?
- Describe the various physical, chemical and bacterial characteristics of testing of rawwater supplies. What steps would you take in order to make them fit for drinking?

QUESTION NO. 3: ATTEMPT ANY TWO PARTS..

(2*7=14)

- What are the quality parameters of safe water? Discuss about standard of drinking water.
- Describe the methods of determining optimum coagulation dose?
- Write the importance of rack bar or screen in wastewater treatment process? Also describe the role angle of inclination of rack bar in management of wastewater treatment plant.

QUESTION NO. 4: ATTEMPT ANY TWO PARTS.

(2*7=14)

- Discuss denitrification techniques used for water treatment.
- Write a note disposal of sewage in sea water.
- Explain how do you collect and dispose off
 - dry refuse
 - sullage
 - excretal waste in rural area

QUESTION NO. 5: ATTEMPT ANY TWO PARTS.

(2*7=14)

- Write a detailed note on biological unit process, employed in wastewater treatment.
- Write a detailed note on advanced or tertiary treatment of wastewater.
- Write a shot note on characteristics of industrial wastewater.

13/05/28

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(B) (SVSU:2022-2023/R)

ENROLLMENT NO.

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M.TECH. (EEM)

1st YEAR, 2nd SEMESTER EXAMINATION
VALUE EDUCATION

Max. Marks:70]

[Time: 3:00 Hrs.

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS

QUESTION NO. 1: ATTEMPT ANY TWO PARTS.

(2*7=14)

- What is moral and non-moral valuation? Explain Piaget's stage of moral development and its characteristics
- What is value education? Why there is a need of value education?
- What is the main idea of concentration and self-reliance? Write few examples of self-reliance. Elaborate the major barriers to concentration.

QUESTION NO. 2: ATTEMPT ANY TWO PARTS.

(2*7=14)

- How can you differentiate between intention and competence? How do they affect human relationship?
- Write a short note on Patriotism and Love for nature.
- How can we develop awareness of self –destructive habits and avoid fault thinking and resolve them?

QUESTION NO. 3: ATTEMPT ANY TWO PARTS..

(2*7=14)

- Give aspects of universal brotherhood and religious tolerance.
- Mention some universally accepted ethical principles.
- Using Indian culture how you would inculcate human values.

QUESTION NO.-4: ATTEMPT ANY TWO PARTS.

(2*7=14)

- What are the basic guidelines for value education?
- What is the need for value education? Write a note on the need for value education in today's scenario?
- How does value education helps in fulfilling one's aspirations?

QUESTION NO. 5: ATTEMPT ANY TWO PARTS.

(2*7=14)

- Differentiate between prosperity and wealth with examples?
- What is our present attitude towards the body? What are its consequences?
- Distinguish self-reliance, confidence and truthfulness.
