**SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

**COLLEGE OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF CIVIL ENGINEERING**

| **Continuous Learning Assessment** | **: CLA-3** | **Date** | **: 9.05.2023** |
| --- | --- | --- | --- |
| **Course Code & Course Name** | **: 18CEO306T Municipal Solid Waste Management** | **Duration** | **: 90 minutes** |
| **Year / Semester** | **: III/ VI** | **Maximum Marks** | **: 50** |
| **Academic year** | **: 2022 - 2023 (Even Semester)** | **Mode of Exam** | **: Offline** |

| **Course Articulation Matrix** | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Learning Outcomes (CLO):** | | Engineering Knowledge | Problem Analysis | Design & Development | Analysis, Design, Research | Modern Tool Usage | Society & Culture | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning | PSO - 1 | PSO - 2 | PSO - 3 |
| **CO-1 :** | Recognize the various sources of solid and hazardous waste | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - | 3 | - | - |
| **CO-2 :** | Identify the options for Reduction, reuse and recycling of waste | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - | 3 | - | - |
| **CO-3 :** | Analyze the collection and transport of solid and hazardous waste | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - | 3 | - | - |
| **CO-4 :** | Recognize the various waste processing techniques | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - | 3 | - | - |
| **CO-5 :** | Identify the waste disposal methods and management | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - | 3 | - | - |

| **Qn. No.** | **Question** | | **Marks** | **BL** | **CO** | **PO** | **PI** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **PART A : Answer all the questions(10 × 1 = 10 Marks)** | | | | | | | |
| 1 | In the low pressure waste compactors, compaction pressure will be   1. >7 kg/cm2 2. <7 kg/cm2 3. 12 kg/cm2 4. 15 kg/cm2 | | 1 | 1 | 4 | 1 | 1.3.1 |
| 2 | Which is mostly used to separate glass from waste stream   1. Optical sorting 2. Previewing 3. Inertial separator 4. Inclined conveyor separator | | 1 | 1 | 4 | 7 | 7.1.1 |
| 3 | Which is the first stage in the composting process of organic solid wastes   1. Curing phase 2. Thermophilic 3. Mesophilic 4. Cooling phase | | 1 | 3 | 4 | 1 | 1.2.1 |
| 4 | In the organic composting process, as the thermophilic bacteria take over in the transition range of   1. 440 to 520C 2. 240 to 320C 3. 250 to 350C 4. 150 to 250C | | 1 | 4 | 4 | 7 | 7.1.1 |
| 5 | The temperature in the incineration process of solid waste roughly in the range of   1. 400o C to 600o C 2. 300o C to 600o C 3. 600o C to 900o C 4. 1200o C to 1500o C | | 1 | 1 | 4 | 1 | 1.2.1 |
| 6. | Which is called fully engineered disposal   1. Direct dumping 2. Open burning 3. Sanitary Landfill 4. Uncontrolled dumping | | 1 | 2 | 5 | 7 | 7.1.1 |
| 7 | The landfilling involves placement and compaction of solid waste was in   1. Area method 2. Trench method 3. Excavated method 4. Canyon method | | 1 | 3 | 5 | 1 | 1.2.1 |
| 8 | Hazardous waste landfills also referred to as   1. Area landfills 2. Secure landfills 3. Depression landfills 4. Trench landfills | | 1 | 3 | 5 | 1 | 1.2.1 |
| 9 | Geomembrane is also called as   1. Flexible liner membrane 2. Rigid liner membrane 3. Soft liner membrane 4. Thin membrane | | 1 | 3 | 5 | 1 | 1.2.1 |
| 10 | It is formed when rainwater filters through the wastes placed in the landfills   1. Leachate 2. Runoff 3. Storm drain 4. Waste drain | | 1 | 2 | 5 | 1 | 1.3.1 |
| **PART B: Answer any four questions (4 × 4 = 16 Marks)** | | | | | | | |
| 11 | Write short notes solid waste screening process. | | 4 | 1 | 4 | 6 | 6.1.1 |
| 12 | Write types of other separation techniques in solid waste. | | 4 | 3 | 4 | 7 | 7.1.1 |
| 13 | Write about the environmental effects of composting and bio gasification of solid wastes. | | 4 | 1 | 4 | 6 | 6.1.1 |
| 14 | Write about the disadvantages of landfilling. | | 4 | 2 | 5 | 7 | 7.1.1 |
| 15 | Write the leachate treatment methods. | | 4 | 2 | 5 | 7 | 7.1.1 |
| **PART C : Answer any one question (2 × 12 = 24 Marks)** | | | | | | | |
| 16.a | | Write in detail about the waste processing techniques. | 12 | 3 | 4 | 6 | 6.1.1 |
|  | | **OR** |  |  |  |  |  |
| 16.b. | | Discuss in detail about the composting process and types. | 12 | 3 | 4 | 6 | 6.1.1 |
| 17.a. | | Describe the steps to design the waste collection system. | 12 | 3 | 5 | 7 | 7.1.2 |
|  | | **OR** |  |  |  |  |  |
| 17.b. | | Explain the different transfer stations and its design considerations. | 12 | 3 | 5 | 7 | 7.1.2 |

----------------------------------------ALL THE BEST -----------------------------