CVL 721 Solid Waste Engineering

Minor Exam Total Marks = 35 Time: 1 Hr 30 Mins

Please read these instructions before you start answering:

This is an open book / open PPT examination. But no downloading / copying from internet allowed. Also, no exchange of documents, answers and no discussions.

If there is any assumption to be made, indicate that it in your answer script.

There is negative marking for irrational / illogical statements/answers. This is not for wrong answers. Maximum of -2 per question.

Kindly stop writing before 5.15 PM, scan your answer script, and email to ***alappat@iitd.ac.in*** *as a single PDF doc once. Kindly use your Roll number and your name as the file name.*

*A****ll these operations must be over before 5.30PM. No answer scripts will be accepted after that.***

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1. **A**. Explain: In general, whatever be the waste type, the biological treatment techniques get priority in comparison with thermal or chemical treatment techniques. Why ?

   B. Explain: The above statement is not exactly applicable to MSW (Municipal solid waste), especially after the implementation of Solid Waste Management Rules 2016. Why ?

   (2 x3 = 6 marks)

2. Refer to the PPT '**MSW to Fuel and Energy – final'**. Go to the slide / page titled '**MSW – Integrated Processing Plant'**. On the flow-sheet given (please modify it, if required), show the mass flow of the material. The MSW data (quantity in TPD, composition of the waste, etc) should be taken from your own Mini Project (the same that was sent to me yesterday). You have to show the flow-sheet with mass flow in TPD (Tons per day) in your answer script with the pertaining calculations and assumptions. Any information that are required, but not covered in your Mini Project, may be suitably assumed.

   (10 Marks)

3. **A**. What is the need of correcting the emissions measured on an incineration plant to check its compliance with the emission standards ? **(3 marks)**

   B. Flue gas from an incineration plant contains large concentrations of particles of average sizes 100 µg and 5 µg, SO_2, Hg^0 and Dioxins & furans. Draw a flow-sheet of the air pollution control equipments that are required and the strategies to be used, if any. Explanations not required. **(4 Marks)**

4. **A**. What are the points to be kept in mind, while planning/designing the platform for windrow composting process ?

   B. What are the parameters to be considered while designing / planning a rotating drum (in vessel mechanical) composting facility ?

   (2 x3 = 6 marks)

5. Explain the Chinese postman problem and the Traveling salesman problem and their application in MSW management. Use any imaginary road network with 5 nodes with an assumption that MSW containers are kept at the nodes and all nodes are interconnected. **(6 Marks)**