CEL 794

Note: Questions are self-explanatory: **Please do no ask any doubt/question.** *Any missing data may be suitably assumed (Please mention it in the answer book).*

You may use the tables in the question paper for calculations and attach the same to your answer script.

Marks: 40   *Answer all questions*   *Duration: 2 hrs*

1. Examine whether the presence of plastics in MSW and Biomedical waste is a blessing or a problem ? Explain why ? **(5 marks)**

2. Assess the MSW (component analysis given below) with respect to C/N ratio whether it is suitable for aerobic composting or not. If it is not good, how do you make it suitable for aerobic composting ? What is your recommendation for that ? **(5 marks)**

Components	Wt. as discarded	% Moisture by Wt.		
Paper	10.27 kg	7 %		
Cardboard	12.30 kg	6		
Plastics	1.50 kg	3		
Food wastes	31.60 kg	52		

Ultimate Analysis of the components of MSW (dry basis)

Components	% C	% H	% O	% N	% S	% ash
Paper	43.5	6	44	0.3	0.2	6
Cardboard	44	5.9	44.6	0.3	0.2	5
Plastics	60	7.2	22.8	-	-	10
Food wastes	48	6.4	37.6	2.6	0.4	5

3. Explain with a sketch (flow sheet of a thermal facility) the generation of fly ash and bottom ash. Why fly ash is considered to be more dangerous than the bottom ash ? **(5 marks)**

4. Calculate the air blower capacity for a rotary kiln incinerator burning MSW of chemical composition $C_{760}H_{1980}O_{874}S$. Note:- rotary Kilns need about 100 to 150 % excess air. **(5 marks)**

5. Explain the need for solidification in the management of nuclear wastes. What are the methods of solidification in use ? **(5 marks)**

6. Discuss the main differences between the rules for hazardous waste management in India that were originally implemented in 1989 and amended in 2002. **(5 marks)**

7. List all the different wastes generated in a hospital. What is the treatment method recommended for each waste ? *(No explanations required)* **(5 marks)**

8. Draw the cross-section of an engineered landfill for MSW and mark on that the various components / parts. *(No explanations required)* **(5 marks)**