National Examination, May 2014

04-Env-A6 – Solid Waste Engineering and Management

3 hours duration

NOTES:

1. There are a total **TWENTY-TWO** (22) examination questions on 2 pages.
2. Each question is of the value indicated. There are ***100 possible*** marks for the examination.
3. This is a **CLOSED BOOK EXAM.**
4. Candidates are permitted **ONE** (1) letter sized aid sheet (8.5 "x 11") both sides.
5. No calculator allowed.
6. ***If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made for the solution of the examination questions.***
7. Clarity and organization of the answers are important.

POINTS		
	Define	
5	**1.1**	Municipal solid waste management
	1.2	Sustainability
	1.3	Vermicomposting
	1.4	Life-cycle analysis
	1.5	Soil porosity
3	**2.**	Name 3 obstacles to solid waste recycling.
3	**3.**	Name 3 Federal Acts that are relevant to waste management.
3	**4.**	What are some of the site features to look for in a sanitary landfill – name 3
3	**5.**	Name 3 strategies you would examine for the management of food wastes
5	**6.**	Why is risk perception important? How can you manage it?
5	**7.**	Outline in point form how you would conduct an assessment of options to extend the lifespan of an existing landfill.
6	**8.**	You have been asked to investigate a composting operation which is emitting an odour. Outline in point form the steps you would take to resolve this problem.
20	**9.**	A community of 50,000 permanent residents has commissioned your company to arrive at a solution for managing additional solid waste generated by an international winter sporting event lasting 3 weeks. How would you approach this challenge? Outline your approach in point form as you would for the main and sub-headings in a report.
3	**10.**	Identify the prerequisites to the biological process of composting.
6	**11.**	What factors affect the composting process and state the reason why.
4	**12.**	If solid wastes are to be used as a fuel, what are the 4 most important properties that must you must know?
5	**13.**	What factors are important in the design of a landfill leachate collection system?
7	**14.**	In siting a new landfill, what are the important considerations?
2	**15.**	Why is knowing the hydraulic conductivity of compacted wastes important?
77	***Sub-total***	

5	**16.**	In order to assess the leachate formation in a landfill draw a definition sketch for a water balance.
4	**17.**	Identify 4 landfill leachate management options.
4	**18.**	Identify how you could maintain an outdoor composting facility during winter.
2	**19.**	What is the most effective way to eliminate the small quantities of hazardous wastes now found in municipal solid waste?
3	**20.**	Identify 3 commonly used methods to assess solid waste quantities.
2	**21.**	What are 2 strategies that allow you to derive energy from municipal wastes?
3	**22.**	Name 3 commonly used unit operations and facilities for the separation and processing of separated and co-mingled municipal solid wastes.

100 TOTAL