

THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering



M. Sc. in Environmental Science - Level 8

NEP2221 – Waste Management and Resource Recovery

Final Examination - 2016/2017

Time Allowed: **Three Hours**

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Date: **26th November, 2017**

Time: **1.30 p.m. – 4.30 p.m.**

Answer any FIVE questions. All questions carry equal marks.

Question 1.

(a) Discuss following statement critically “Improper handling of Municipal Solid Waste create Environmental and Health Issues”.

[06 marks]

(b) (i) List important properties of Solid Waste.

(ii) Briefly discuss importance of those properties in Solid Waste Management.

(iii) Briefly explain different transformation methods of Municipal Solid Waste management.

[10 marks]

(c) (i) List the principles of National Solid Waste management policy of Sri Lanka (published in year 2007) explain one of those briefly.

[04 marks]

Question 2.

(a) (i) Briefly explain the parameters influencing Perishable Waste Composting.

(ii) List modern methods of Perishable Waste Composting.

(iii) Briefly explain one modern method of Perishable Waste Composting.

[10 marks]

(b) (i) Brief waste transformation techniques.

(ii) What are the available solid waste sorting techniques? List them.

[06 marks]

(c) (i) List different solid waste composting techniques.

(ii) What is the importance of shredding in Municipal Solid waste management?

[04 marks]

Question 3.

- (a) (i) Describe differences between pyrolysis and gasification.
 (ii) Briefly explain parameters affecting to "Anaerobic Digestion".
 (iii) Classify "Anaerobic Digesters" briefly.
 [10 marks]
- (b). What are the criteria to be considered in selection of the best option for waste to Energy recovery?
 [04 marks]
- (c). (i) List types of bio reactors in Sri Lanka.
 (ii) What are the advantages and disadvantages of anaerobic digestion in waste management?
 [06 marks]

Question 4.

- (a) Landfills are used as the final disposal option of solid waste management. List and explain five factors pertinent to the selection of landfill site.
 [05 marks]
- (b) (i) Explain the purpose of the daily cover in a sanitary landfill and state the minimum desirable depth of daily cover.
 (ii) Discuss the environmental pollution associated with open dump sites.
 [07 marks]
- (c) (i) Define leachate and explain why it occurs.
 (ii) Describe 2 methods available for leachate treatment.
 [08 marks]

Question 5.

- (a) (i) The regulations define characteristic hazardous wastes as wastes that exhibit measurable properties posing sufficient threats to warrant regulations. List those.
 (ii) List three technologies can be used to pollution prevention from hazardous waste? Describe one technology in brief.
 [07marks]
- (b) (i) What are the hazardous properties of health care waste?
 (ii) Classify solid waste generated at hospital and briefly explain recommended method of handling sharp waste.
 [06 marks]

Q6 Contd...

Q6 Contd.

- (c) (i) How radioactive waste are disposed?
(ii) Some waste that can't be recycled or reused is inevitable. What can we do with it? Explain briefly.
- [07 marks]

Question 6.

- (a) (i) Why the e-waste has become a global issue? Explain briefly.
(ii) Mention three Multilateral Environmental Agreements (Conventions) available on E-waste management and write short description on one of those.
- [08 marks]
- (b) (i) What are the upstream strategies practice in managing E-Waste. List them.
(ii) Describe two downstream strategies that can be applied to manage the e-waste?
- [06 marks]
- (c) (i) Briefly describe the regulatory frame work to manage E- waste in Sri Lanka?
(ii) What are the challenges on managing E-waste in Sri Lanka?
- [06 marks]

Question 7.

- (a) (i) List four environmental factors to be considered in the Life Cycle Assessment.
(ii) Explain two of them.
- [06 marks]
- (b) Briefly explain three strategies that can be proposed to overcome the poor administrative and organizational setup of waste management within a province of Sri Lanka.
- [06 marks]
- (c) (i) 'Solid waste is the main contributor on global warming'. Discuss briefly.
(ii) Explain the scenarios that can be used for mitigating Green House Gas emissions
- [08 marks]

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