KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (WATER ENGINEERING)

SET 524: HAZARDOUS WASTES MANAGEMENT

DATE: MONDAY 5TH DECEMBER 2011 TIME: 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS:

1) Answer **Three** Questions
2) Question **ONE** is Compulsory
3) Answer any other **TWO** Questions

Q1 a) Outline " Basel Convention on the Trans-boundary Movements of hazardous Wastes and Their Disposal" providing the details list of wastes which are known to be hazardous. (15 Marks)

b) The following three soil layers are lying between the base of a hazardous waste landfill and underlying aquifer. How long will it take for leachate to migrate to the aquifer?

Type of **soil**	**Depth (m)**	**Permeability (m/s)**
Soil A	4.0	1.6×10^{-8}
Soil B	10.0	2.0×10^{-4}
Soil C	12.0	5.8×10^{-7}

(25 Marks)

Q2 a) Medical waste should be rendered safe before disposal. Explain giving the types of medical waste. (7 marks)

List the different types of hazardous wastes and give the hazardous waste reduction examples. (3 Marks)

b) What are real considerations for the decision to treat the waste and the choice of treatment method? (3 Marks)

c) What are the main chemical and physical methods for the treatment of medical waste? (7 Marks)

Q3 a) State six medical waste categories explaining the comparison of each category by using a table, give an example of the treatment methods related to the type of the waste. (10 Marks)

b) Briefly describe the export of hazardous waste stating suitable storage facilities. (10 Marks)

Q4 (a) List the treatment processes of hazardous wastes, and explain. (10 Marks)

b) Name five(5) suitable materials for re use, recycling, and the technology to be used for the recovery purposes (5 Marks)

c) Indicate four (4) treatment and disposal processes of hazardous wastes (5 marks)

Q5 The distance between the bottom of a hazardous waste landfill and underlying aquifer is 10 m. The underlying clay layer has the permeability of 10^{-7}cm/sec. Assuming infiltration is unlimited, how much leachate (in m^3/d) will flow down the 100 hectares landfill? (20 Marks)