



# **NATIONAL OPEN UNIVERSITY OF NIGERIA**

14/16, Ahmadu Bello Way, Victoria Island

## **SCHOOL OF SCIENCE AND TECHNOLOGY OCTOBER, 2013 EXAMINATION**

**COURSE CODE:**ESM 444**DURATION:** 2 HOURS

**COURSE TITLE:** INDUSTRIAL WASTES AND INDUSTRIAL WATER TREATMENT

**CREDIT UNIT:** 2

***INSTRUCTION: Answer any 4 questions***

1. (a) Describe how closed circulation system operates.  
(b) Briefly explain what causes increase in corrosion and how it is controlled in a closed system.  
(c) State the advantages of closed re-circulating water system.
2. (a) Describe the different methods of boiler water treatment.  
(b) What are involved in boiler water treatment? (List five (5))  
(c) Explain the problems that are common to boilers.
3. (a) Write short note on the following:
  - i. Preliminary treatment
    - ii. Primary treatment
    - iii. Biological treatment
    - iv. Chemical treatment, in relation to industrial wastewater treatment.
- (b) Describe briefly the treatment of:
  - (i) toxic material
  - (ii) acids and alkalis, in wastewater.
4. Write extensively on the following;
  - (i) How are industrial wastes produced?
  - (ii) Impact of industrial waste on the environment.
5. (a) What is waste management?  
(b) Discuss any two methods of disposing waste.  
(c) State the various means of reducing waste.
6. (a) Explain the process involved in recycling an organic waste.  
(b) Outline the advantages of recycling waste.  
(c) What is Recycling?