



National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science
SEPTEMBER, 2019_2 EXAMINATIONS

COURSE CODE: ESM 444

COURSE TITLE: Industrial Waste and Industrial Water Treatment.

CREDIT: 2 Units

TIME ALLOWED: 2 Hours

Instruction: Attempt question number ONE (1) and any other THREE (3) questions. Question number one (1) carries 25 marks, while the other questions carry (15) marks each.

- 1a) Give a brief definition of the following concepts (10mks)
- Incineration method
 - Landfill method
 - Integrated waste management method
 - Waste Management
 - Biochemical oxygen demand (BOD)
 - Chemical oxygen demand (COD)
- 1b) Reduction of wastes can be achieved by? (6mks)
- 1c) Outline the forms in which contaminants and/or impurities are found in wastewaters (5mks)
- 1d) Describe the two main types of boilers used for industrial applications (2mks)
- 1e) Explain the deaeration process (2mks)
- 2) Analyse the biological treatment process of waste water treatment (15mks)
- 3a) List the variables on which the physical processes depend on (4mks)
- 3b) Highlight the essentials of a boiler water treatment (5mks)
- 3c) Explain how the following types of recirculation water system works (6mks)
The additive systems (ii) The open systems (iii) The closed systems
- 4a) Name the physical treatment processes (5mks)
- 4b) State the advantages of closed recirculating water system (10mks)
- 5a) Enumerate on the advantages of recycling (7mks)
- 5b) What are the major problems with landfills method of disposing wastes?(4mks)
- 5c) Identify the processes involved in the removal of solids (4mks)