



NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SEPTEMBER/OCTOBER 2015 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE TITLE: INDUSTRIAL WASTE AND INDUSTRIAL WATER TREATMENT

COURSE CODE: ESM 444

DURATION: 2 HOURS

INSTRUCTION: ANSWER ANY FOUR QUESTIONS

1. (a) List the three (3) types of Recirculation water systems.
(b) In which of the systems is make-up water needed and what role does it play?
(c) Briefly explain two (2) Recirculation water systems in which make-up water is not applicable. (8 mks)
(d) Mention four (4) applications of the most popular method of controlled cooling of Water treatment. (4 mks)
2. (a) What major problems are addressed by treatment of boiler water? (4 mks)
(b) Industrial boiler water treatment involves what? (10 mks)
(c) List the main sources of industrial waste waters. (3 ½ mks)
3. (a) Explain what the following involves :
(i) Removal of solids (2 mks)
(ii) Removal of oils and grease (2 mks)
(iii) Treatment of acids and alkalis (2mks)
(iv) Treatment of toxic materials (4 mks)
(b) Mention at least ten (10) industrial wastes. (5 mks)
(c) What effects does industrial waste have on the environment? Itemize. (2 mks)
4. (a) It is a fact that Waste management Practices depends on the type of waste and varies from place to place but what does Waste Management generally involve? (5 mks)

- (b) How can wastes be reduced? (6 mks)
- (c) Explain the following Waste Management methods:
- (i) Integrated method (2 ½ mks)
 - (ii) Incineration method (4 mks)
5. (a) List the main methods of waste collection. (3 mks)
- (b) What category of wastes are recyclable? Mention seven (7) (7 mks)
- (c) Mention and explain the method employed in managing organic wastes. (5 mks)
- (d) How would you define Recycling? Give at least two (2). (2 ½ mks)
6. (a) State the merits of closed recirculation water system. (10mks)
- (b) What is involved in Landfill method of waste disposal? (1 ½ mks)
- (c) List the advantages of Recycling. (6 mks)