



# UNIVERSITY OF RUHUNA

## Faculty of Engineering

End-Semester 1 Examination in Engineering: August 2018

Module Number: CE1101

Module Name: Basic Concepts in Environmental Engineering

### SECTION – B

[One Hour]

[Answer all questions. Total Marks 30]

Q1. Sri Lanka government plans to extend the southern expressway from Hambantota to Kataragama. Assume you are also included in this project as a young engineer at the planning stage. Government authorities intend to implement this project as one of the "Sustainable Development Projects".

a) Planning of such sustainable project recognises the interconnections between Three Key Sustainable Aspects. Name these three sustainable aspects. [1.5 Marks]

b) List Two possible factors that may be considered under each Sustainable Aspect during the planning of this expressway project. [3.0 Marks]

c) Government authorities also intend to carry out an EIA (Environmental Impact Assessment) for this expressway project.

i) Name Five possible environmental component that must be considered in this EIA [2.5 Marks]

ii) Name three possible Negative and three Positive impact from this project. [3.0 Marks]

Q2. Dissolved Oxygen (DO) is an essential water quality parameter and refers to the level of free, non-compound oxygen present in water.

a) Name Three factors that may affect DO concentration in water [1.5 Marks]

b) Figure Q2-1 shows the daily DO variation in an urban lake. Briefly explain the reasons for this daily variation. [2.0 Marks]

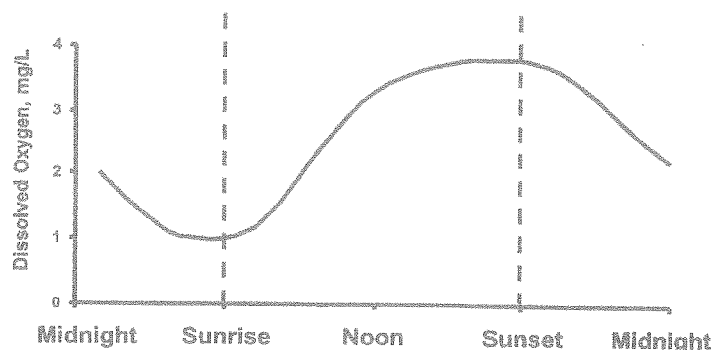


Figure Q2-1: Daily DO variation in an urban lake

- c) It was observed that DO as 7 mg/L at 10 C° during winter season in a stream that flows through a city in Europe during winter.
- i) Determine the percent saturations of dissolved oxygen (DO) in this stream. You may use DO saturation monogram in Figure Q2-2. (It is not necessary to attach the DO monogram to answer sheets)

[1.5 Marks]

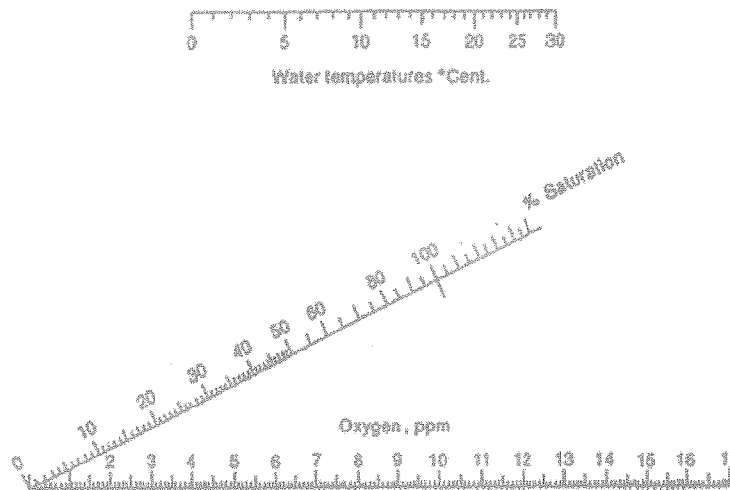


Figure Q2-2: DO saturation monogram

- ii) What can be the highest possible DO in the same place of this stream during summer when the temperature reaches 25 C°.

[1.5 Marks]

- d) A 400 mL aqueous solution has 4.5mg of salt dissolved in it. Express the concentration of salt in this solution in terms of (i) mg/L and (ii) ppb

[2.0 Marks]

- e) How much greater is the  $[H^+]$  in an aqueous solution with pH 2 than in a solution with pH 4?

[1.5 Marks]

- Q3) a) Bioaccumulation and biomagnification are two terms commonly used to discussed toxicity of metals, pesticides, POPs, etc in water. Briefly explain the difference between "Bioaccumulation" and "Biomagnification". You may use figures if needed.

[2.5 Marks]

- b) Contamination of the air by harmful gases and particulates in concentrations will endanger human and environmental health.

- i) What is meant by "Primary" and "Secondary" pollutants in Air Pollution.

[2.0 Marks]

- ii) Give Two examples for each primary and secondary pollutants.

[2.0 Marks]

- c) Briefly explain what is meant by "Water Foot Print"

[1.5 Marks]

- d) Uncontrolled dumping and improper waste handling cause land pollution and a variety of environmental and health related problems. Name Four such problems.

[2.0 Marks]