Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level 1st Semester Examination – July/August 2016

Uva Wellassa University

MRT 323-1 Pollutant Transport in Water

Total number of questions: Two (02)
Answer all questions
Time Allocated: One (01) hour
Mark Allocation: 100

1.

a) List the different particle types in surface waters. Describe their origin and role in pollutants transport.

b) Discuss different mass transport processes of pollutants in water.

c) Average annual discharge of sediments in a river is 3500 m^3s^{-1} and the average annual suspended sediment concentration is 186 mgL^{-1}. Calculate the annual total advective sediment flux of the river.

d) Illustrate two (02) remediation techniques used in groundwater pollution.

(50 marks)

2.

a) Determine the normal discharge and the average flow velocity for a clay drain with internal diameter of 400 mm that runs with half capacity. If the Reynolds Number is 12,500 for this flow, what can you comment on the nature of this flow? (Slope drops 1 m over 1000 m; Manning's Roughness Coefficient for clay is 0.013)

b) A settling chamber is used to remove sand particles from the sewage flow through a wastewater treatment plant. The chamber is 2 m deep and the residence time (retention time) of water in the chamber is 4.4 hr. What is the minimum size of particles which would be completely removed by settling on the bottom during the passage through the chamber?

Density of sand 2.65 gcm^{-3}
Kinematic viscosity of water 1.3×10^{-2} cm^2s^{-1}
Assume that any particle that settles on the bottom of the chamber is removed.
(Hint: Removal requires that the settling distance during passage through the chamber is equal to the chamber depth)

(50 marks)

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