

FINAL EXAMINATIONSCHOOL OF ENVIRONMENTAL AND
CIVIL ENGINEERING TECHNOLOGY

TERM	COURSE NAME	COURSE CODE	VERSION
2201	Environmental Hydrology	HDG451	(version A)

Student Name (Last, First)	(write your full name here)
Student Number	(write your student number here)
Section	(write your section number here)

DATE: April 15, 2020; 3 pm to 5 pm
 TIME ALLOWED: 2 hours
 PERCENTAGE: 30%
 TOTAL MARKS: 30
 PROFESSOR(S): Ali Yeganeh

INSTRUCTIONS:

1. Attempt all questions and state any assumptions, if required.
2. Show all your work and indicate your answers clearly.
3. Please read the questions carefully to make sure that you understand what you required to do.
4. The assessment must be written in a clear and organized form. Show all necessary steps to solve the problems and an explanation where required.
5. Indicate your answer clearly, the final result must be written in a box.
6. **Upload the JPEG image or PDF copy of your solution in the blackboard (Assignments>Final-Assessment) within the 15 minutes after the test end (by 5:15 pm)**

This exam includes a *cover page*, plus 1 pages of questions.

Academic Integrity

As a Seneca student, you must conduct yourself in an honest and trustworthy manner in all aspects of your academic career. A dishonest attempt to obtain an academic advantage is considered an integrity offense, and will be addressed according to Seneca's Academic Integrity Policy.

- i. **For any extra information please state your assumptions and the reason behind of your assumptions.**
 - ii. **Use the IDF curve provided in the course documents.**
1. For the watershed data shown below, plot the most appropriate simple hydrograph for: **(14 marks)**
 - a) a 30-minute, 25-year storm;
Drainage area = 42 ha; watershed slope = 1.9%, length of flow path = 1200m; cultivated with crops, clay loam soil
 - b) a 12-hour, 100-year storm
Land use: 25 ha neighbourhood business; 10 ha detached residential; 12 ha multiple attached residential; 2 ha playground.
 - c) Estimate the volume of the runoff from these storm events using the simple hydrograph method.
 2. Calculate the storage at saturation for the watershed conditions shown below. If 16mm of precipitation occurs, will there be any runoff? If a 48mm rainfall event occurs, will there be any runoff? If runoff does occur, then what will be the total volume of runoff? **(10 marks)**
 - a) Drainage area = 68ha; sandy clay loam; pastureland
 - b) 24 hectares; Suburban residential; 1/3-acre lots and sandy clay load soil.
 3. Calculate the time of concentration for the a 30-minute, 25-year storm; a 12-hour, 100-year storm for the basin conditions described below:
25 ha, suburban residential development, 15 ha of very closely trimmed grass course and 12 ha of unimproved area. If the length of flow path is 1250m, the slope of the drainage area is 2.5% and the soil investigations shown that the land has a clay loam soil. Comment on does the change in the frequency of the event has any effect on the time of concentration if does how it will affect the time of concentration and why. **(6 marks)**