1. [20 pts] Please give a brief introduction to *Hydrological Cycle* (*Water Cycle*) and also draw the cycle, which must include at least six major hydrological processes: precipitation, infiltration, transpiration, evaporation, surface runoff, and groundwater flow.

2. [20 pts] What is the hydrological budge? Please explain.

3. [20 pts] There is a rectangular catchment area with the coordinates of its four corners being (0, 0), (0, 10), (14, 10), and (14, 0), respectively. Four rainfall stations were setup in the catchment area, and the coordinates of each station and the recorded precipitation are listed in the following table. The unit of the coordinates is kilometer. Please use the Thiessen method to calculate the average precipitation in this area.

Rainfall station	1	2	3	4
Coordinate (km)	(4, 2)	(4, 7)	(11, 7)	(11, 2)
Precipitation (cm)	1.5	2.0	2.4	4.3

4. [20 pts] Gross rain intensities during each hour of a 5-hr storm over a 1000 km^2 basin were 5, 4, 1, 3 and 2 cm/hr, respectively. The direct surface runoff from the basin was 60 km^2-m. Determine the basin ϕ index for estimation of infiltration.

5. [20 pts] Let us consider two basins and assume the precipitation pattern to be mainly orographic. Basin A is near the coastline and the ground elevation is relatively flat. Basin B is at the slope of the mountain range where the ground elevation changes significantly. Which of the two methods: Thiesson Polygon Method, and Isohyetal Method would you use to obtain the areal precipitation for Basin A and why? Which method would be used for Basin B and why? (Please state the critical points and do not spend much time on detailed descriptions.)