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**CIVIL ENGINEERING**

**17/ENG03/061**

**HYDROLOGY ASSIGNMENT 1**

**Write briefly on any 5 software used in carrying out the hydrologic study of a place.**

1. **Precipitation Runoff Modeling System (PRMS)**

The Precipitation-Runoff Modeling System (PRMS) is a deterministic, distributed-parameter, physical process based modeling system developed to evaluate the response of various combinations of climate and land use on streamflow and general watershed hydrology. The primary objectives are:

1. simulate hydrologic processes including evaporation, transpiration, runoff, infiltration, and interflow as determined by the energy and water budgets of the plant canopy, snowpack, and soil zone on the basis of distributed climate information (temperature, precipitation, and solar radiation);
2. simulate hydrologic water budgets at the watershed scale for temporal scales ranging from days to centuries;
3. provide a modular design that allows for selection of alternative hydrologic-process algorithms from the standard PRMS module library.
4. **iRIC Software**

iRIC software is a free numerical simulation platform supporting a wide variety of computational solvers for problems in water science and engineering.

1. **MODFLOW**

MODFLOW is the USGS's modular hydrologic model. MODFLOW is considered an international standard for simulating and predicting groundwater conditions and groundwater/surface-water interactions. MODFLOW 6 is presently the core MODFLOW version distributed by the USGS. The previous core version, MODFLOW-2005, is actively maintained and supported as well.

1. **SWAT**

The Soil & Water Assessment Tool is a small watershed to river basin-scale model used to simulate the quality and quantity of surface and ground water and predict the environmental impact of land use, land management practices, and climate change. SWAT is widely used in assessing soil erosion prevention and control, non-point source pollution control and regional management in watersheds.

1. **QGIS**

QGIS is the most popular GIS tool with an impressive trajectory and a vibrant community. It also even has a particular ecosystem of complements called “plugins”. QGIS is a completely open source alternative that reduces the cost barriers since it does not need a paid license and can be executed in any operative system.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| time | runoff | baseflow | direct runoff | depth of direct runoff | 2hr unit hydrograph ordinate |
| 1 | 110 | 110 | 0 | 1.415 | 0 |  |  |
| 2 | 120 | 110 | 10 | 1.415 | 7.067138 |  |  |
| 3 | 230 | 110 | 120 | 1.415 | 84.80565 |  |  |
| 4 | 570 | 110 | 460 | 1.415 | 325.0883 |  |  |
| 5 | 640 | 110 | 530 | 1.415 | 374.5583 |  |  |
| 6 | 430 | 110 | 320 | 1.415 | 226.1484 |  |  |
| 7 | 290 | 110 | 180 | 1.415 | 127.2085 |  |  |
| 8 | 200 | 110 | 90 | 1.415 | 63.60424 |  |  |
| 9 | 160 | 110 | 50 | 1.415 | 35.33569 |  |  |
| 10 | 120 | 110 | 10 | 1.415 | 7.067138 |  |  |
| 11 | 90 | 90 | 0 | 1.415 | 0 |  |  |
| 12 | 80 | 80 | 0 | 1.415 | 0 |  |  |
|  |  |  |  |  |  |  |  |