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17/ ENG03 /016

ENG 302 ASSIGNMENT

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

SOLUTION

1. QGIS: QCGIS 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.
2. SAGA GIS : SAGA GIS is a GIS platform oriented to spatial analysis. SAGA GIS is a simple but powerful tool, with a big library focused on spatial analysis and characterization of basins. The interpolation options in SAGA GIS are better implemented than in other free and commercial software.
3. HEC-RAS :The numerical model HEC-RAS is developed by the U.S. Army Corps of Engineers. This model uses the gradient and topography to evaluate the flow depth, velocities and flooded zones. It is also useful to calculate sediment transport and water temperature.
4. iRIC : iRIC (International River Interface Cooperative) is a software developed with the purpose of offering a complete simulation environment of the riverbed and its results can be exported and used to analyze, mitigate and prevent disasters, through the visualization of the results of the river simulation.
5. MODFLOW : This code performs groundwater modeling based on finite differences developed by the United States Geological Survey (USGS). It is capable of simulating groundwater 2D and 3D flux and simulate the principal physical processes related to the groundwater regime such as recharge, evapotranspiration, pumping, drainage, etc.
6. Using the total direct runoff hydrograph given in Fig. Q1, derive a unit hydrograph for the l7I5 ac drainage area. (Provide soft copy of table and all necessary graphs)

SOLUTION

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |  |  |  |

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