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17/ENG03/032

1)

a 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 temperature

b SWAT

SWAT is a tool to evaluate soil and water at a basin scale. It is focused in precipitation-runoff modeling and transport of water and solutes through surface flow. It predicts the impacts of soil management practices in water resources and sediments

C. 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.

D. . 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.
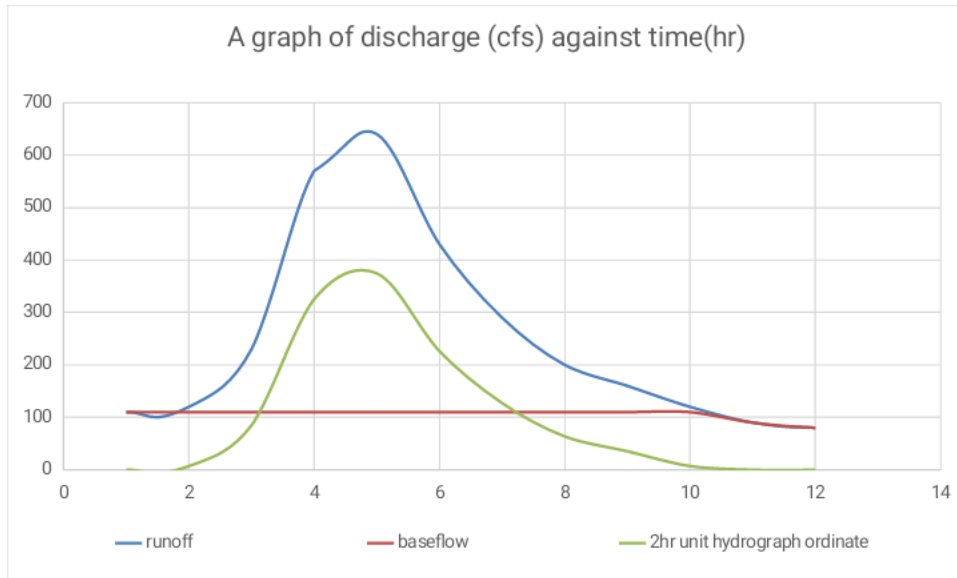
E. Python

This is the favorite code for scientific, water resources and environment analysis. It has several packages for different tools such as GIS, mathematical analysis and artificial intelligence.

1) 2) Using the total direct runoff hydrograph given in Fig. Q1, derive a unit hydrograph for the l7l5 ac drainage area. (Provide soft copy of table and

all necessary graphs)

<u>SOLUTION</u>

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

A graph of discharge (cfs) against time(hr)

— runoff   — baseflow   — 2hr unit hydrograph ordinate

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