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17/ENG03/004

Question 1

Hydrologic modeling

- HEC-HMS

The Hydrologic Modeling System (HEC-HMS) is designed to simulate the hydrologic processes in basins. The software includes traditional procedures of hydrologic analysis, such as infiltration events, unit hydrograms and routing. HEC-HMS also includes modules for evapotranspiration, snow melting and calculus

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HYDROLOGIC MODEL OF AN EVENT IN AN ANDEAN BASIN

PRMS

The modeling code PRMS (Precipitation Runoff Modeling System) is a modular system of spatially distributed parameters, which represent the physical processes of a basin. It was developed by the United States Geological Survey (USGS) to evaluate the effects of several combinations of geomorphology, type of soil, soil use, vegetation and climatic parameters in the hydrological response of a basin.

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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

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- Hydrogeological modeling

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,

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NUMERICAL MODEL OF A 3D ANDEAN BASIN IN MODFLOW

MT3DMS

The MT3DMS package is a mass transport model coupled to a flux model in MODFLOW. The MT3DMS code simulates advection, dispersion/diffusion and chemical reactions of adsorption/absorption of contaminants in groundwater.

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MODELING OF A CONTAMINANT PLUME IN A MINING

Question 2

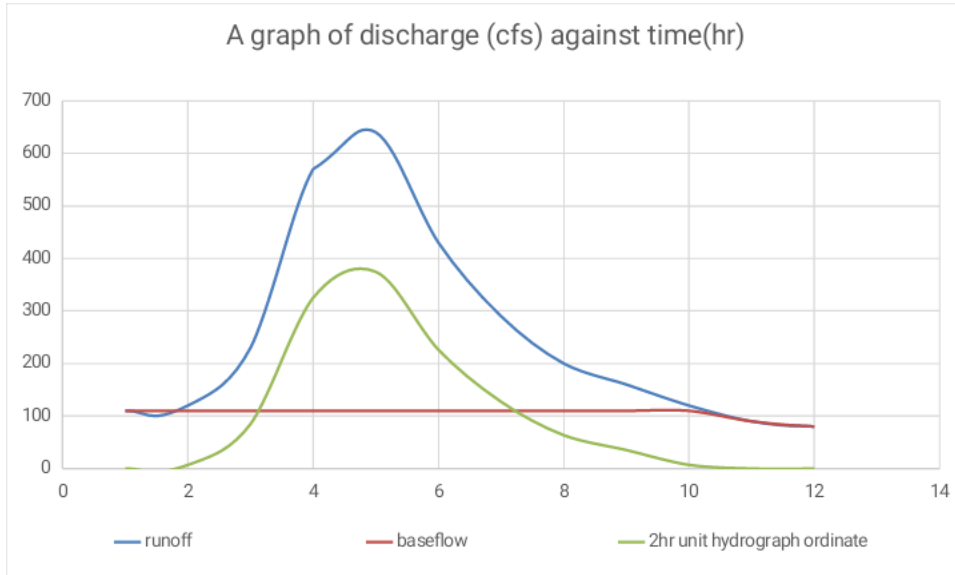
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- 1) hydrograph given in Fig. Q1, derive a unit hydrograph for the 1715 ac drainage area. (Provide soft copy of table and all necessary graphs)

SOLUTION

time	runoff	baseflo w	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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