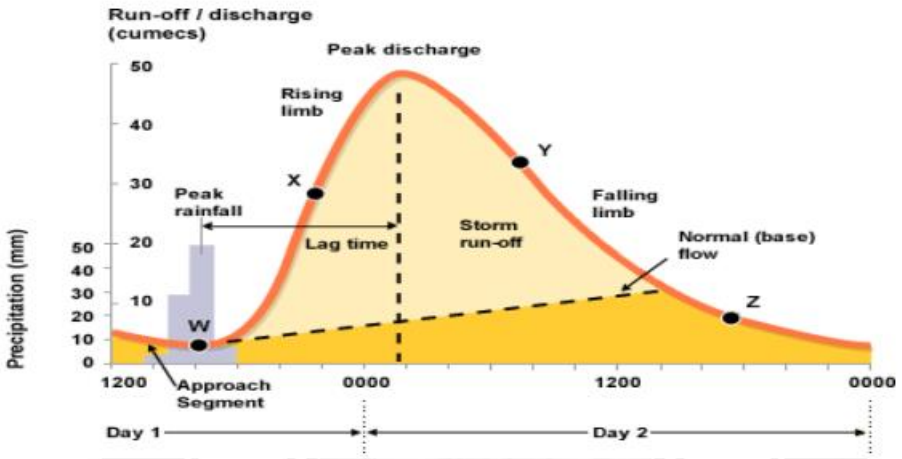
I. HYDROGRAPH

A hydrograph is a graph showing the rate of flow (discharge) versus time past a specific point in a river, channel, or conduit carrying flow. The rate of flow is typically expressed in cubic meters or cubic feet per second (cms or cfs). It can also refer to a graph showing the volume of water reaching a particular outfall, or location in a sewerage network. Graphs are commonly used in the design of sewerage, more specifically, the design of surface water sewerage systems and combined sewers.



1.1 A unit hydrograph

A unit hydrograph (UH) is the hypothetical unit response of a watershed (in terms of runoff volume and timing) to a unit input of rainfall. It can be defined as the direct runoff hydrograph (DRH) resulting from one unit (e.g., one cm or one inch) of effective rainfall occurring uniformly over that watershed at a uniform rate over a unit period of time. As a UH is applicable only to the direct runoff component of a hydrograph

Basic Assumptions Of UH

(i) The effective rainfall is uniformly distributed over the entire drainage basin.

(ii) The effective rainfall occurs uniformly within its specified duration. This requirement calls for selection of storms of so small a duration which would generally produce an intense and nearly uniform effective rainfall and would produce a well-defined single peak of hydrograph of short time base. Such a storm can be termed as ―unit storm‖.

(iii) The effective rainfalls of equal (unit) duration will produce hydrographs of direct runoff having same or constant time base.

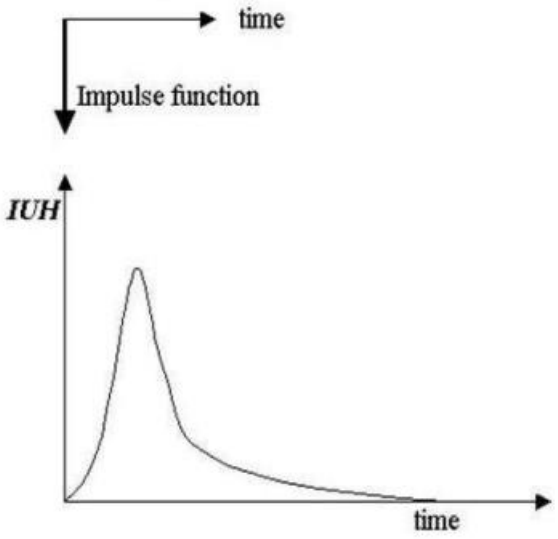
(iv) The ordinates of the direct runoff hydrographs having same time base (i.e., hydrographs due to effective rainfalls of different intensity but equal duration) are directly proportional to the total amount of direct runoff given by each hydrograph. This important assumption is called principle of linearity or proportionality or superposition.

(v) The hydrograph of runoff from a given drainage basin resulting, from a given pattern of rainfall reflects all the combined physical characteristics of the basin. In other words the hydrograph of direct runoff resulting from a given pattern of effective rainfall will remain invariable irrespective of its time of occurrence. This assumption is called principle of time invariance

1.3 Instantaneous Unit Hydrograph (IUH).

• The instantaneous unit hydrograph is defined as a unit hydrograph produced by an effective rainfall of 1 mm and having an infinitesimal reference duration (in other words the duration tends towards zero).

• IUH is the direct runoff hydrograph resulted from an impulse function rainfall i.e., one unit of effective rainfall at a time instance.



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