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Peak Drainage Discharge Formula Formulas

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List of 18 Peak Drainage Discharge Formula Formulas

Peak Drainage Discharge Formula

Peak Drainage Discharge by Empirical Formula

Burkli Ziegler Formula

1) Drainage Area for Peak Rate of Runoff

Open Calculator

fx $$A_D = \left(\frac{Q_{BZ} \cdot 455}{K' \cdot I_{BZ} \cdot \sqrt{S_o}} \right)^2$$

ex $$30\text{ha} = \left(\frac{1.34\text{m}^3/\text{s} \cdot 455}{251878.2 \cdot 7.5\text{cm/h} \cdot \sqrt{0.045}} \right)^2$$

2) Maximum Rainfall Intensity given Peak Rate of Runoff

Open Calculator

fx $$I_{BZ} = 455 \cdot \frac{Q_{BZ}}{K' \cdot \sqrt{S_o \cdot A_D}}$$

ex $$0.002083\text{cm/h} = 455 \cdot \frac{1.34\text{m}^3/\text{s}}{251878.2 \cdot \sqrt{0.045 \cdot 30\text{ha}}}$$

3) Peak Rate of Runoff from Burkli-Ziegler Formula

Open Calculator

$$Q_{BZ} = \left(\frac{K' \cdot I_{BZ} \cdot A_D}{455} \right) \cdot \sqrt{\frac{S_o}{A_D}}$$

$$482400\text{m}^3/\text{s} = \left(\frac{251878.2 \cdot 7.5\text{cm/h} \cdot 30\text{ha}}{455} \right) \cdot \sqrt{\frac{0.045}{30\text{ha}}}$$

4) Runoff Coefficient for Peak Rate of Runoff

Open Calculator

$$K' = \frac{455 \cdot Q_{BZ}}{I_{BZ} \cdot \sqrt{S_o \cdot A_D}}$$

$$251878.2 = \frac{455 \cdot 1.34\text{m}^3/\text{s}}{7.5\text{cm/h} \cdot \sqrt{0.045 \cdot 30\text{ha}}}$$

5) Slope of Ground Surface given Peak Rate of Runoff

Open Calculator

$$S_o = \left(\frac{Q_{BZ} \cdot 455}{I_{BZ} \cdot K' \cdot \sqrt{A_D}} \right)^2$$

$$0.045 = \left(\frac{1.34\text{m}^3/\text{s} \cdot 455}{7.5\text{cm/h} \cdot 251878.2 \cdot \sqrt{30\text{ha}}} \right)^2$$

Dicken's Formula

6) Catchment Area given Peak Rate of Runoff

Open Calculator

fx $$A_{km} = \left(\frac{Q_{PD}}{x} \right)^{\frac{4}{3}}$$

ex $$2.5\text{km}^2 = \left(\frac{628716.7\text{m}^3/\text{s}}{10.00} \right)^{\frac{4}{3}}$$

7) Factors Dependent Constant given Peak Rate of Runoff

Open Calculator

fx $$x = \left(\frac{Q_{PD}}{(A_{km})^{\frac{3}{4}}} \right)$$

ex $$10 = \left(\frac{628716.7\text{m}^3/\text{s}}{(2.5\text{km}^2)^{\frac{3}{4}}} \right)$$

8) Peak Rate Runoff from Dicken's Formula

Open Calculator

fx $$Q_{PD} = x \cdot (A_{km})^{\frac{3}{4}}$$

ex $$628716.7\text{m}^3/\text{s} = 10.00 \cdot (2.5\text{km}^2)^{\frac{3}{4}}$$

Dredge or Burge's Formula

9) Catchment Area given Peak Rate of Runoff from Dredge Formula

Open Calculator

fx $$A_{km} = \frac{Q_d \cdot (L)^{\frac{2}{3}}}{19.6}$$

ex $$2.5\text{km}^2 = \frac{212561.2\text{m}^3/\text{s} \cdot (3.5\text{km})^{\frac{2}{3}}}{19.6}$$

10) Peak Rate of Runoff from Dredge Formula

Open Calculator

fx $$Q_d = 19.6 \cdot \left(\frac{A_{km}}{(L)^{\frac{2}{3}}} \right)$$

ex $$212561.2\text{m}^3/\text{s} = 19.6 \cdot \left(\frac{2.5\text{km}^2}{(3.5\text{km})^{\frac{2}{3}}} \right)$$

Inglis Formula

11) Catchment Area given Peak Rate of Runoff from Inglis Formula

Open Calculator

fx $$A_{km} = \left(\frac{Q_I}{123} \right)^2$$

ex $$2.499998\text{km}^2 = \left(\frac{194.48\text{m}^3/\text{s}}{123} \right)^2$$

12) Peak Rate of Runoff from Inglis Formula Approximate

Open Calculator

fx $$Q_I = 123 \cdot \sqrt{A_{km}}$$

ex $$194.4801 m^3/s = 123 \cdot \sqrt{2.5 km^2}$$

Nawab Jung Bahadur Formula

13) Peak Rate of Runoff from Nawab Jung Bahadur Formula

Open Calculator

fx $$Q_{NJB} = C_2 \cdot (A_{km})^{0.93-\left(\frac{1}{14}\right)\cdot \log 10(A_{km})}$$

ex $$125.6423 m^3/s = 55 \cdot (2.5 km^2)^{0.93-\left(\frac{1}{14}\right)\cdot \log 10(2.5 km^2)}$$

Ryve's Formula

14) Factors Dependent Constant from Ryve's Formula

Open Calculator

fx $$C_R = \left(\frac{Q_r}{(A_{km})^{\frac{2}{3}}}\right)$$

ex $$6.786044 = \left(\frac{125000 m^3/s}{(2.5 km^2)^{\frac{2}{3}}}\right)$$

Peak Drainage Discharge by Rational Formula

15) Catchment Area given Peak Rate of Runoff and Rainfall Intensity

Open Calculator

$$A_c = \frac{36 \cdot Q_R}{C_r \cdot P_c}$$

$$14.92539\text{ha} = \frac{36 \cdot 4166.67\text{m}^3/\text{s}}{0.5 \cdot 2.01\text{cm/h}}$$

16) Coefficient of Runoff given Peak Rate of Runoff

Open Calculator

$$C_r = \frac{36 \cdot Q_R}{A_c \cdot P_c}$$

$$0.497513 = \frac{36 \cdot 4166.67\text{m}^3/\text{s}}{15.0\text{ha} \cdot 2.01\text{cm/h}}$$

17) Critical Rainfall Intensity for Peak Rate of Runoff

Open Calculator

$$P_c = \frac{36 \cdot Q_R}{A_c \cdot C_r}$$

$$2.000002\text{cm/h} = \frac{36 \cdot 4166.67\text{m}^3/\text{s}}{15.0\text{ha} \cdot 0.5}$$

18) Peak Rate of Runoff in Rational Formula

Open Calculator

fx $$Q_R = \frac{C_r \cdot A_c \cdot P_c}{36}$$

ex $$4187.5\text{m}^3/\text{s} = \frac{0.5 \cdot 15.0\text{ha} \cdot 2.01\text{cm/h}}{36}$$

Variables Used

- A_c Area of Catchment *(Hectare)*
- A_D Drainage Area *(Hectare)*
- A_{km} Catchment Area in KM *(Square Kilometer)*
- C_2 Coefficient
- C_r Runoff Coefficient
- C_R Ryve's Coefficient
- I_{BZ} Intensity of Rainfall in Burkli Zeigler *(Centimeter per Hour)*
- **K'** Runoff Coefficient for Burkli Zeigler
- **L** Length of Drain *(Kilometer)*
- P_c Critical Rainfall Intensity *(Centimeter per Hour)*
- Q_{BZ} Peak Rate of Runoff for Burkli Zeigler *(Cubic Meter per Second)*
- Q_d Peak Rate of Runoff from Dredge Formula *(Cubic Meter per Second)*
- Q_I Peak Rate of Runoff for Inglish *(Cubic Meter per Second)*
- Q_{NJB} Peak Rate of Runoff for Nawab Jung Bahadur *(Cubic Meter per Second)*
- Q_{PD} Peak Rate of Runoff from Dickens Formula *(Cubic Meter per Second)*
- Q_r Peak Rate of Runoff in ryves formula *(Cubic Meter per Second)*
- Q_R Peak Drainage Discharge by Rational Formula *(Cubic Meter per Second)*
- S_o Slope of the ground
- **x** Constant

Constants, Functions, Measurements used

- Function: **log10**, log10(Number)
  The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.
- Function: **sqrt**, sqrt(Number)
  A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: **Length** in Kilometer (km)
  Length Unit Conversion
- Measurement: **Area** in Hectare (ha), Square Kilometer (km²)
  Area Unit Conversion
- Measurement: **Speed** in Centimeter per Hour (cm/h)
  Speed Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
  Volumetric Flow Rate Unit Conversion

Check other formula lists

- **Channel Flow Time and Time of Concentration Formulas**
- **Peak Drainage Discharge Formula Formulas**
- **Rainfall Intensity Formulas**

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