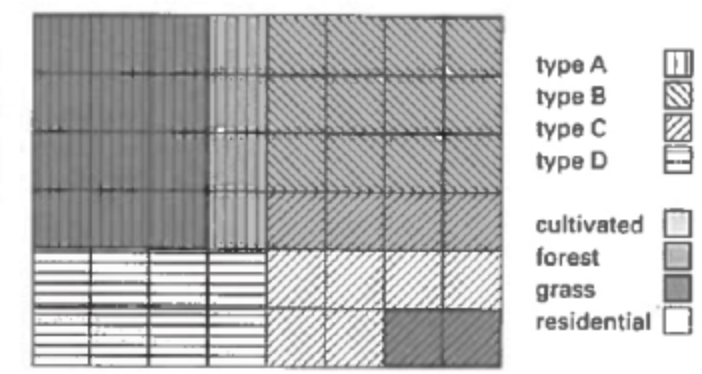
# Hydrology (New Engine)

1 Multiple Choice 1 point

Calculator

Each square in the watershed shown is 1 acre in size.




curve numbers

| land use | soil type | | | |
|---|---|---|---|---|
| | type A | type B | type C | type D |
| residential | 57 | 72 | 81 | 66 |
| grass | 30 | 58 | 71 | 78 |
| forest | 25 | 55 | 70 | 77 |
| cultivated | 62 | 71 | 78 | 81 |

Using the tabulated curve numbers for the land uses based on soil type, what is the weighted curve number for the entire 48 acre watershed?

- 56
- 61
- 49
- 68

2 Multiple Choice 1 point Calculator

The flow rate in a rectangular channel 4 meters wide is 20 $m^3/s$. The critical depth is

- 2.0 meters
- 2.7 meters
- 1.0 meters
- 1.4 meters

3 Multiple Choice 1 point Calculator

A residential lot of 0.37 acres contains a house that occupies 0.05 acres, and a driveway that covers 0.035 acres. The runoff coefficients are 0.50 for the undeveloped portions of the lot, 0.85 for the house, and 0.90 for the driveway. The peak discharge from the lot during a storm event with rainfall intensity of 0.5 inches per hour is

- 0.085 cfs
- 0.320 cfs
- 0.110 cfs
- 0.250 cfs

4 Multiple Choice 1 point Calculator

A 25 acre drainage basin has a curve number of 81. The basin receives 4.5 inches of rainfall in a 24 hour period. The total runoff, in watershed inches is

- 4.80 inches
- 0.81 inches
- 2.60 inches
- 0.33 inches

5 Multiple Choice 1 point

Calculator

A 6 meter wide, rectangular channel carries 24 $m^3/s$ at critical depth. The velocity is

- 14 m/s
- 1.1 m/s
- 3.4 m/s
- 6.3 m/s

6 Multiple Choice 1 point

Calculator

A 3.5 acre drainage area receives a rainfall intensity of 0.5 in/hour; the peak runoff from the area is 500 gallons per minute. What is the runoff coefficient?

- 0.64
- .11
- 0.86
- 0.31

7 Multiple Choice 1 point

Calculator

A rectangular concrete channel has a depth of 3 meters, a width of 5 meters, and a slope of 0.004. The Manning's roughness coefficient for the channel is 0.013. When full, the velocity of water in the channel is

- 90 m/sec
- 15 m/sec
- 6.0 m/sec
- 1.0 m/sec

8 Multiple Choice 1 point

Calculator

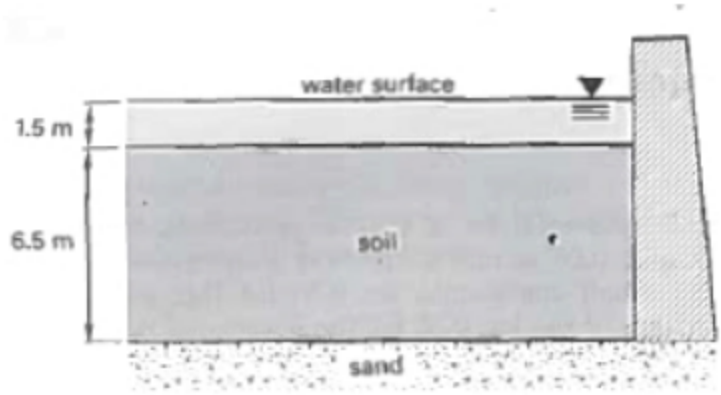
A drainage basin with a curve number of 72 receives 5 inches of rain during a two-day storm. The runoff from the basin in watershed inches is

- 2.20 inches
- 4.10 inches
- 0.52 inches
- 0.62 inches

9 Multiple Choice 1 point

Calculator

A concrete dam impounds water as shown. The standing water depth is 1.5 meters. The soil layer under the reservoir is underlain by a highly porous sand layer. The sand layer at the bottom of the soil profile has horizontal drainage and zero pore pressure.




The water level of the reservoir is constant. The total surface area of the reservoir pool is 1000 $m^2$, and the hydraulic conductivity of the soil layer is $4.7\times10^{-6}$ mm/sec. The loss from seepage through the soil layer per year is

- 180 cubic meters
- 34 cubic meters
- 1.1 cubic meters
- 2.8 cubic meters

10 Multiple Choice 1 point

Calculator

An unconfined aquifer is 300 feet deep, and has a hydraulic conductivity of 0.5 feet per day. A one-foot diameter well is drilled into the aquifer an pumped at a rate of 50 gallons per minute. The well's radius of influence is 1000 feet. After pumping has continued long enough for equilibrium to be established, the depth of water in the well is

- 220 feet
- 90 feet
- 270 feet
- 240 feet