



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Agri. Engg.) 2016 Admission
III Semester Final Examination-January-2018

Lwre.2104

Watershed Hydrology (2+1)

Marks: 50
Time: 2 hours
(10x1=10)

- I
- Fill in the blanks:
- 1 The -----method is the simplest method of determining a real average rainfall.
 - 2 -----is the process of water penetrating from the ground surface into the soil.
 - 3 In Phillip's infiltration equation ----- is the function of the soil suction potential.
 - 4 The total volume of flow under the annual hydrograph is the -----yield.
 - 5 -----is the ratio of the peak rate of direct runoff to the average intensity of rainfall in a storm.
 - 6 -----are lines of equal time of flow to the outlet of watershed.
 - 7 -----is the ratio of the total length of stream channels in a watershed to its area.
 - 8 Measurement of infiltration are made using a -----
 - 9 A fine sprinkle of numerous water droplets of size less than 0.5 mm and intensity less than 1 mm/ hr is known as-----
 - 10 The recurrence interval is also known as -----

- II
- Write Short notes on ANY FIVE of the following (5x2=10)
- 1 Classify the rainfall on the basis of intensity.
 - 2 Describe the orographic precipitation.
 - 3 What do you mean by coefficient of variation? Write its mathematical form.
 - 4 Write a short note on Intensity-Duration-Frequency relationship?
 - 5 Enlist the different direct and in-direct methods of stream flow measurement.
 - 6 Enlist the use and limitations of unit hydrograph.
 - 7 Write a short note on Gumbel's distribution method.

PTO

III

Answer ANY FIVE of the following

(5x4=20)

1. A small tube with a cross sectional area of 40 cm^2 is filled with soil and laid horizontally. The open end of the tube is saturated and after 15 minutes 100 cm^3 of water have infiltrated into the tube. If the saturated hydraulic conductivity of the soil is 0.4 cm/hr . Determine how much infiltration would have taken place in 30 minutes if the soil column had initially been placed upright with it's upper surface saturated.
2. Define the term Hydrology. Write it's applications in short?
3. Estimate the maximum flood flow for the following catchment by using an appropriate empirical formula. Assume necessary data if required.
 1. $A1 = 40.5 \text{ km}^2$ for Western Ghat area, Maharashtra.
 2. $A2 = 40.5 \text{ km}^2$ for Gangetic plain
 3. $A3 = 40.5 \text{ km}^2$ for Curvery delta, Tamil Nadu
 4. What is the peak discharge for 40.5 km^2 by the maximum flood experience? (Dickens coefficient = 6.0, Ryves coefficient = 6.8.)
4. Write in brief about the guidelines adopted by CWC, India for selecting design floods.
5. What are the different measures of flood control? Explain any one structural method of flood control.
6. Write down the different types of climatic regions along with their characteristics?
7. What are the factors affecting runoff.

IV

Write an essay on ANY ONE of the following

(1x10=10)

1. Rainfall of magnitude 3.8 cm and 2.8 cm occurring on two consecutive 4- hr duration on a catchment of area 27 km^2 produced the following hydrograph of flow at the outlet of the catchment. Estimate the rainfall excess and Φ -index. Assume necessary data if required.

Time from start of rainfall(hr)	-6	0	6	12	18	24	30	36	42	48	54	60	66
Observed flow(m^3/sec)	6	5	13	26	21	16	12	9	7	5	5	4.5	45

2. Write in details about the various effects and types of drought. Explain in detail on drought management strategies.
