Total No. of printed pages = 7

END SEMESTER EXAMINATION - 2019

Semester : 6th

Subject Code : CT-612

WATER RESOURCE ENGINEERING

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* the questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Pick up the correct statement from the following : 1

(a) Water remains in atmosphere as vapors.

(b) Rain water is obtained by evaporation from rivers, lakes and oceans.

[Turn over

(c) Hydrologic cycle is a continuous process of evaporation and precipitation of water in atmosphere.

(d) All of the above.

2. Choose the correct answer :

Unit Hydrograph theory was enunciated by 2

(a) Le-Roy K. Shermen

(b) W.W. Horner

(c) Merril Bernard

(d) Robert E. Horten.

3. Pick up the correct statement from the following : 2

(a) The actual infiltration rate at any time may be equal to or less than the infiltration capacity.

(b) The actual prevailing rate of infiltration of water in the soil at any time, is known as infiltration rate.

(c) When rainfall rate is less than the infiltration capacity, the infiltration rate is approximately equal to the rainfall rate.

(d) All of the above.

4. Choose the correct option :

(i) The surface Run-off is the quantity of water 2

(a) intercepted by buildings and vegetative cover

(b) absorbed by soil

(c) required to fill surface depressions

(d) that reaches the stream channels

(ii) Infiltration capacity of soil depends upon 2

(a) arrangement of soil particles

(b) compaction of the soil particles

(c) shape and size of soil particles

(d) All of the above.

5. Pick up the correct statement from the following : 2

(a) The term 'transmissibility' was introduced by Meinzer.

(b) The flow of water through aquifers, is governed by the Darcy's law.

(c) The rate of flow of water through a vertical strip of the aquifer of unit width and full depth under a unit hydraulic gradient, is called coefficient of transmissibility.

(d) The ratio of coefficient of transmissibility and coefficient of permeability, is equal to the depth of aquifer through which water flows.

6. Choose the correct option :

(i) Isohyets are the imaginary lines joining the points of equal 2

(a) rainfall (b) pressure

(c) humidity (d) height

(ii) Hydrograph is a graphical representation of 2

(a) surface run off

(b) rain fall

(c) ground water flow

(d) discharge flowing in the river

(iii) The time required by rain water to reach the outlet of drainage basin, is generally called 2

(a) time of overland flow

(b) time of concentration

(c) concentration time of overland flow

(d) duration of the rainfall

(iv) The best instrument for measuring the velocity of a stream flow is 2

(a) sub-surface float

(b) pitot tube

(c) current meter

(d) surface float

(v) Symon's rain gauge is 2

(a) tipping-bucket gauge

(b) Non-recording gauge

(c) float recording gauge

(d) weighing type gauge

(vi) For predicting floods of a given frequency, the reliable method is 2

(a) California method

(b) Gumbel's analytical method

(c) None of the above

(d) Unit hydrograph method

(vii) Phytometer method is generally used for the measurement of 2

(a) evaporation (b) interception

(c) transpiration (d) None of these.

PART – B

Marks – 45

7. What do you mean by river training ? What are the general techniques for protecting the river bank ? Describe three techniques of them with appropriate figure. 9

8. The peak of flood hydrograph due to 3-hour duration isolated storm in a catchment is 270 m^3/s. The total depth of rainfall is 5.9cm. Assuming an average infiltration loss of 0.3cm/hour and constant base flow of $20m^3/s$, estimate the peak 3-hour unit hydrograph of the catchment. If the area of catchment is $567Km^2$ then determine the base width of 3-hour unit hydrograph by assuming it to be triangular in shape. 9

9. What are the assumptions made in the Unit Hydrograph Theory ? Describe the method of deriving a new Unit Hydrograph of duration that is a non-integer multiple of the duration of an already available Unit Hydrograph. 9

10. Write short notes on : 3×3=9

(a) Aquifer

(b) Darcy's Law

(c) Aquitard

11. What are the effects, causes and remedial measures of water logging in agricultural land ? 9

12. Derive the differential equation for unsteady ground water flow in a confined aquifer. 9