CT-612/WRE/6th Sem/2018/M

WATER RESOURCE ENGINEERING

Full Marks – 70

Time – Three hours

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

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.

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

    (d) All of the above.

[Turn over

2. 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. 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

5. 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.

6. Pick up the correct equation 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 acquifer through which water flows.

7. Isohyets are the imaginary lines joining the points of equal : 2

(a) rainfall (b) pressure

(c) humidity (d) height

8. Hydrograph is a graphical representation of : 2

(a) surface run-off

(b) rainfall

(c) ground water flow

(d) discharge flowing in the river

9. 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

10. 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

11. Symon's rain gauge is   2

    (a)   tipping-bucket gauge

    (b)   non-recording gauge

    (c)   float recording gauge

    (d)   weighing type gauge

12. For predicting floods of a given frequency, the reliable method is   2

    (a)   California method

    (b)   Gumbel's analytical method

    (c)   None of these

    (d)   Unit hydrograph method

13. Phytometer method is generally used for the measurement of $\quad$ 2

   (a) evaporation $\qquad$ (b) interception

   (c) transpiration $\qquad$ (d) None of these.

PART – B

Marks – 45

Answer any *five* questions.

14. 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. $\qquad$ 9

15. The peak of flood hydrograph due to 3-hour duration isolated storm in a catchment is 270 m³/s. The total depth of rainfall is 5.9 cm. Assuming an average infiltration loss of 0.3 cm/hour and constant base flow of 20 m³/s, estimate the peak 3-hour unit hydrograph of the catchment. If the area of catchment is 567 km² then determine the base width of 3-hour unit hydrograph by assuming it to be triangular in shape. $\qquad$ 9

16. 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

17. Write short notes on :

                                                    3×3=9

    (a) Aquifer

    (b) Darcy's Law

    (c) Aquitard

18. Write about different types of rainfall measuring instruments.
                                                             9

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