(ii) 15% risk is acceptable, what return period will have to be adopted?

UNIT-V

9. a. What is Flood Routing? Explain its categories. 4

   b. Explain the Hydrologic channel routing with diagram. 6

   c. What is the hydrologic method of flood routing. Explain its categories. 4

10. a. what is a farm pound ? Write the component of farm pound with a diagram. 6

    b. What is an earthen dam? Explain the design parameter of an earthen dam. 4

    c. Describe the importance of "Depth- Capacity Curve", and calculate the water holding capacity at middle depth of pond. If Pond areas are enclosed by different contours as. 4

Contour value(m)	175	177	179	181	183	185	187
Area Enclosed (m^2)	315	390	450	495	535	600	640

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M. Tech Odd Semester Examination, February, 2023

Agricultural Engineering
(Water Rescources Development Management)

(1st Semester)

Course No.: 1AE-101

(Hydrology Water Resource Engineering)

Full Marks: 70
Pass Marks: 28

Time: 3 hours

Note:
1. Attempt 05 (Five) questions by taking one form each unit.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the question.

UNIT-I

1. a. What is hydrologic cycle ? Draw the complete diagram of hydrologic cycle explain how it works. 7

   b. Explain the distribution of water on earth with a proper diagram. 3

   c. Write the effects of 4

   i. Agricultural changes

   ii. Structural changes

   iii. Draw the flowchart of catchment scale.

2. a. What is precipitation? Write the different forms of precipitation with definition. 7

b. The normal annual precipitation of five rain gauge stations P,Q,R,S and T are respectively 125, 105, 75, 115 and 140 cm. During a particular storm the precipitation recorded by stations P,Q,R and S are 13.2, 9.5, 6.4 and 10.5 cm respectively. The instrument at station T was inoperative during that storm. Estimate the rainfall at station T during that storm? 3

c. Write the difference between recording and nonrecording rain gauge. 3

UNIT-II

3. a. What is water budget equation? Express the whole equation. 8

b. A small catchment of area 160 ha received a rainfall of 11.5 cm in 95 minutes due to a At the outlet of the catchment, the stream draining the catchment was dry before the storm and experienced a runoff lasting for 11 hours with an average discharge of 1.6 m^3/s. The stream was again dry after the runoff event.

(i)What is the water which was not available to runoff due to combined effect of infiltration, evaporation and transpiration?

(ii) What is the ratio of runoff to precipitation? 6

4. a. Write a short note on application of hydrology in engineering. 7

b. What is a cyclone ? what are the types of different type of cyclones?Draw a schematic section of a Tropical cyclone. 7

UNIT-III

5. a. Write Short note with diagram:

i) Mass Curve of Rainfall 5

ii) Hyetograph 5

iii) Point Rainfall 4

6. a. Explain the whole process for frequency of point rainfall. 8

b. Analysis of data on maximum one-day rainfall depth at Madras indicated that a depth of 280 mm had a return period of 50 years. Determine the probability of a one-day rainfall depth equal to or greater than 280 mm at Madras occurring

(i) once in 20 successive years,

(ii) two times in 15 successive years, and

(iii) at least once in 20 successive years. 6

UNIT-IV

7. a. What are the factors affecting flood hydrograph? 5

b. Explain the different methods of base flow separating the base flow. 5

c. Explain the Unit Hydrograph with a proper diagram? 4

8. a. what are the method used to estimate the magnitude of a flood peak? 3

b. define 5

(i) Risk and reliability (ii) Safety factor

c. A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 years. 6

(i) What is the risk of this hydrologic design?