2019

B.Tech Even Semester (CBCS) Exam., May—2019

AGRICULTURAL ENGINEERING

(4th Semester)

Course No. : AECC–14

(Watershed Hydrology)

Full Marks : 50
Pass Marks : 15

Time : 2 hours

Note : 1. Answer *any* **five** questions.
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 margin indicate full marks for the questions.

1. Explain the following in brief : 2×5=10

(a) Weighing-type rain gauge

(b) Symon's rain gauge

(c) Tipping bucket gauge

(d) Floating-type rain gauge

(e) Precipitation

2. Define the following terms : 2×5=10

(a) Convective precipitation

(b) Orographic precipitation

(c) Cyclonic precipitation

(d) Point analysis

(e) Fronts

3. *(a)* Explain different methods of estimating the missing rainfall data. 5

(b) Precipitations station *X* was inoperative for part of a month during which a storm occurred. The respective storm totals at three surrounding stations *A*, *B* and *C* were 107 mm, 89 mm and 122 mm. The normal annual precipitation amounts of stations *X*, *A*, *B* and *C* are respectively, 978 mm, 1120 mm, 935 mm and 1200 mm. Estimate the storm precipitation for station *X*. 5

4. *(a)* What do you mean by adequacy of rain gauge stations of a catchment? Explain the methods of getting optimum number of stations in the catchment. 5

(b) There are four rain gauge stations existing in the catchment of a river. The average annual rainfall values at these stations are 800 mm, 620 mm, 400 mm and 540 mm, respectively. Determine the optimum number of rain gauges in the catchment if it is desired to limit the error in the mean value of rainfall in the catchment to 10%. How many more gauges will then be required to be installed? 5

5. Describe the following : 2×5=10

(a) Forms of precipitation

(b) Mean areal precipitation

(c) Station consistency

(d) Theissen polygon method

(e) Normal ratio method

6. *(a)* Explain various factors affecting the shape of hydrograph. 6

(b) Write short notes on the following : 1×4=4

(i) Unit hydrograph

(ii) DRH

(iii) Mass curve

(iv) ERH

7. *(a)* State the use and limitations of unit hydrograph. 2+2=4

(b) Describe the procedure to derive the unit hydrograph from flood hydrograph. 6

8. *(a)* What do you mean by synthetic unit hydrograph and instantaneous unit hydrograph? 2

(b) Ordinates of a 4-h unit hydrograph are given. Using this derive the ordinates of a 2-h unit hydrograph for the same catchment : 8

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4-h unit hydrograph (m^3/s)	0	20	80	130	150	130	90	52	27	15	5	0

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