53 (CE 711) HDLG

2017

HYDROLOGY

Paper : CE 711

Full Marks : 100

Time : Three hours

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

Answer ***All*** *questions.*

1. *(a)* What do you mean by rain gauge? Write in details about the non-recording rain gauges.

   (b) In a watershed the following data were recorded a self recording rain gauge :

Time since beginning of the storm (*mm*)	15	30	45	60	75	90	105	120
Accumulated rainfall (*mm*)	15	40	60	75	95	135	170	175

Compute the maximum rainfall intensity. 5+10=15

2. *(a)* Write in details about Depth-Area-Duration relationship of a storm over a catchment.

(b) A watershed has five non-recording rain gauges installed in its area. The annual rainfall recorded for one of the year is as follows :

Rain gauge station	I	II	III	IV	V
Annual rainfall (*cm*)	90	110	175	95	125

Determine the optimum number of non-recording and recording rain gauges for the watershed. Assume an error of 10% in the estimation of mean rainfall.

5+10=15

3. *(a)* Describe how a current meter is used for computation of velocity of flow in a stream.

(b) Describe the type of stage recorder for measurement of stream stage. Write in details about *any one* of stage recorder with figure. 5+5=10

4. *(a)* Describe the stage-discharge relationship for an unsteady flow over a catchment.

(b) Write a short note on estimation of missing annual precipitation data.

5+5=10

5. (a) What do you mean by mass curve of rainfall?

(b) Generally water equivalent of snowfall is considered to be equal to _____ %.

(c) What do you mean by Isohyet and Hyetograph?

(d) For what purpose controls are laid out in a stream?

(e) What do you mean by relative stage of a stream? 5×2=10

6. Define precipitation and write down a short description about all forms of precipitation. Also write down the water budget equation for atmosphere. 15

7. Write down the standard setting which are adopted for sitting a rain gauge.

Write down working principle of weighing bucket type rain gauge with figure.

5+10=15

8. The normal annual precipitation of seven rain gauge station A, B, C, D, E, F, G are respectively 135*cm*, 112*cm*, 86*cm*, 123*cm*, 137*cm*, 142*cm* and 155*cm*. During a particular storm the precipitation recorded by A, B, C, D, E and F are 14·5*cm*, 10·2*cm*, 7·8*cm*, 9·2*cm*, 11·3*cm* and 12·6*cm* respectively. The instrument at station 'G' was damaged due to storm. Estimate missing rainfall data at station 'G' during that storm. 10