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SIXTH SEMESTER **B.Tech. (ENE)**

MID SEMESTER EXAMINATION **(MARCH-2019)**

ENE-306 HYDROLOGY & GROUNDWATER ENGINEERING

Time : 1Hour 30 **Max. Marks : 25**

Note : Answer all questions.
Assume suitable missing data, if any.

Q 1 Answer all the following questions:

(a) Explain a procedure for checking a rainfall data for consistency. 2

(b) Explain the types of Precipitation. 2

(c) Differentiate the ϕ- index and w- index. 2

(d) Explain Rainfall –Runoff Co-relation equation. 2

(e) Explain Flow Duration curve. 2

Q 2 Answer all the following questions:

(a) A catchment area has 7- stations in a year. The annual rainfall recording by the gauges are follows:- 3.5

Station	P	Q	R	S	T	U	V
Rainfall(cm)	125	135.4	117	108.7	165.5	148.9	104.5

For a 8% of error in the estimation of mean rainfall calculate the minimum numbers of additional stations required to be establish in the catchment.

(b) A catchment area is in the form of a hexagon having sides 25km.The hexagon having 7 rain gauge stations, 6 located at the vertices & one in the centre, recording precipitation values as 15, 25, 39, 45, 55, 61 & 75 cm respectively. Determine the average precipitation in the catchment by Thiessen-Polygon method and also show your calculation in a tabular form. 4

Q 3 Answer all the following questions:

(a) Calculate the potential evapotranspiration from an area near 4.5

P.T.O.

New Delhi in the month

of November by Penman's formula:

The following data are available:-

Latitude = $28^0 5'N$

Elevation = 240m

Mean Monthly temp. = 20^oC

Mean relative humidity = 85%

Mean observed sunshine house = 8.5h

Wind Velocity at 2m height = 95km/day

Nature of Surface = bare land

$A = 1.00mm/^0C$

$e_w = 16.7mm$ of Hg

Ha = 9.5 mm of water/day

N = 10.75hrs.

(b) An isolated storm in a catchment produced a runoff of 4.2 cm. The mass curve of the average rainfall depth over the catchment was as below: 3

Time from beginning of the storm (h)	0	1	2	3	4	5	6
Accumulated average rainfall (cm)	0	0.50	1.65	3.55	5.65	6.85	7.95

Calculate the ϕ index for the storm.

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