

KATHMANDU UNIVERSITY  
End Semester Examination  
August/September, 2017

SEP 04 2017

Level : B. E.  
Year : II  
Time : 2 hrs. 30 mins.

Course : CIEG 206  
Semester : II  
F. M. : 40

SECTION "B"

Attempt *ALL* questions. Make suitable assumptions wherever needed. The figures in the parenthesis indicate the marks allocated for the question.

1. A catchment has six rain gauge stations. In a year, the annual rainfall recorded by the gauges are as follows [5]

Rain gauge station	A	B	C	D	E	F
Rainfall (cm)	82.6	102.9	180.3	110.3	98.8	136.7

- a. Determine the standard error in the estimation of mean rainfall in the existing set of rain gauges.
  - b. For a 10% error in the estimation of the mean rainfall, calculate the optimum number of rain gauge stations in the catchment.
2. The isohyet due to a storm in a catchment were drawn as shown in Figure 1. and the area of the catchment bounded by isohyets were tabulated as below [3]

Isohyets (cm)	Station -12.0	12.0- 10.0	10.0-8.0	8.0-6.0	6.0-4.0
Area ( Km <sup>2</sup> )	30	140	80	180	20

Estimate the mean precipitation due to the storm.

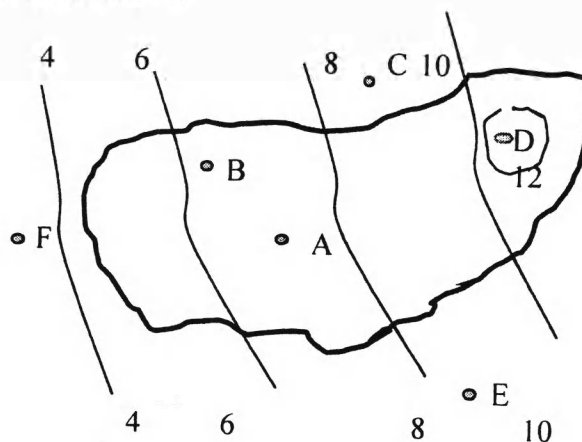


Figure 1.

3. A storm with 20cm of precipitation produced a surface runoff of 11.6 cm. Estimate the  $\Phi_{\text{index}}$  of the storm and total rainfall excess if the data recorded is as follows [4]

Storm time (h)	1	2	3	4	5	6	7	8
Incremental rainfall/h (cm)	0.8	1.8	3.0	4.6	3.6	3.2	2.0	1.0

4. What do you understand by routing of flood? Differentiate between hydrologic and hydraulic routing [3]
5. What is sediment? Describe the impact of sediment in hydropower project. [4]
6. The annual flood peaks at a gauging site from 1970 -90 are given below. [7]

Year	1970	71	72	73	74	75	76	77	78	79	80
Flood	1065	645	1005	1350	860	150	2260	650	2840	990	870
Year	1981	82	83	84	85	86	87	88	89	90	
Flood	910	750	930	750	1070	830	1095	384	2230	3210	

7. Explain the following terms (Any Three) [3 × 3 = 9]
- Transmissivity
  - Reservoir sedimentation
  - Hydrologic model classification
  - Approaches of Sediment Management
  - Methods of Stream flow measurement
8. Pumping at a rate of 1500 lpm from a 30 cm diameter test well penetrating in to 60m of an unconfined aquifer gives drawdown of 2.0 and 1.1m in observation wells located respectively at 120 and 160 m away from it. Calculate (i) hydraulic conductivity of the aquifer (ii) drawdown of the pumping well. [5]



