

**B.Tech. Civil (Construction Management)**  
**Term-End Examination**  
**December, 2006**

**ET-535(A) : ELEMENTARY HYDROLOGY**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Answer any **five** questions. Give neat and labelled sketches. Write answers in your own language wherever necessary.

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1. (a) Discuss the natural processes that contribute to the availability of water on land surface.
- (b) How do we carry out a regional water budget study ? 7, 7
  
2. (a) With the help of a neat sketch, explain the structure of atmosphere with respect to geometric heights of different spheres vs. temperature and pressure.
- (b) What is the importance of atmospheric pressure records ? 10, 4

3. With the help of neat diagram, explain the working principle, and construction of 7, 7
- (i) recording stream gauging station
  - (ii) snow sampling equipment
4. (a) Discuss the influence of the following factors on evaporation : 6
- (i) Vapour pressure
  - (ii) Radiation
  - (iii) Temperature
  - (iv) Humidity
  - (v) Wind
  - (vi) Barometric pressure
- (b) A deep and large lake has a surface area of 300 hectares; and the following parameters govern a given ten-day period :
- (i) Water temperature = 25° C that gives  
 $l_w = 23.76$  mm of Hg
  - (ii) Relative humidity = 50%
  - (iii) Wind velocity at 1.0 m height above the ground  
= 15.0 km/hr
- Estimate the average daily evaporation from the lake, and the total volume of water evaporated from it during this 10-day period.
- If the water temperature is 30° C [i.e.,  $e_w = 31.82$  mm of Hg], how much percent increase will take place in the evaporated water mass, considering all other factors remaining the same ? 8

5. (a) What steps would you follow to develop a unit hydrograph ?
- (b) Discuss interception as a process in hydrologic cycle, and explain the factors influencing it; and, also outline as to how it is quantitatively estimated. 7, 7
6. List and classify different techniques of discharge measurement. Explain electromagnetic and ultrasonic methods. How are these methods superior to mechanical methods ? 4, 5, 5
7. Write short notes on any **four** of the following :  $4 \times 3 \frac{1}{2} = 14$
- (i) Stage-discharge relationship
  - (ii) Basin response mechanism
  - (iii) Double mass curve analysis
  - (iv) Potential evapotranspiration
  - (v) Infiltration
  - (vi) India's Water Budget