B.Tech. Civil (Construction Management)

Term-End Examination

June, 2010

ET-535(A) : ELEMENTARY HYDROLOGY

Time : 3 hours   *Maximum Marks : 70*

Note :   *All questions carry* **equal** *marks.* *Q. 1 is* **compulsory** *and answer* **any four** *from the remaining questions. Draw neat sketches in support of your answer.*

1.   State whether the following statements are **true** or **false** :   7x2=14

   (a)   Evaporation in pan is less than that in lake.

   (b)   When rainfall begins, the infiltration rate is low and it increases with time.

   (c)   W index and ϕ index vary from storm to storm.

   (d)   Current meter is used in Electromagnetic method of streamflow measurement.

   (e)   Potential evapotranspiration is more than the actual evapotranspiration at the same area.

   (f)   Unit hydrograph is used to estimate flood peak.

   (g)   In a channel flow, energy line is above the water surface line in the channel.

2. (a) Draw a self explanatory block diagram representing the hydrologic system. **7**

   (b) Discuss various forms of precipitation. **7**

3. (a) Differentiate between evaporation and evapotranspiration. Describe various factors affecting evaporation ? **7**

   (b) A tank with surface area of 25 ha had the following average parameters during a week : **7**

   Water Temperature = 20°C

   Relative Humidity = 40%

   Wind Velocity at 1 m above ground level = 16 km/hr.

   Estimate the average daily evaporation from the Tank and volume of water evaporated during that one week. (Assume Saturated Vapour Pressure at 20°C = 17.54 mm of Hg).

4. (a) Explain the functioning of non-recording and recording types of raingauges. **7**

   (b) Discuss the Thiessen Polygon method of estimation of average depth of precipitation. **7**

5. Define the following terms : **7x2=14**

   (a) Direct precipitation

   (b) Base flow

   (c) Inter flow

(d)   Surface runoff

(e)   Backwater effect

(f)   Storm hydrograph

(g)   Time of concentration

6.   (a)   Explain the Slope-Area method of discharge measurement.   **4**

   (b)   In a 15 m wide rectangular channel, the depth of flow are measured as 3.2 m and 3.1 m at two sections 250 m apart. The drop in water surface elevation was found to be 0.11 m. Assuming manning's roughness coefficient = 0.015, estimate the discharge through the channel.   **10**

7.   (a)   What are the assumptions made in the derivation of unit hydrograph ordinates ?   **4**

   (b)   Derive the formula used in Muskingum method of channel routing.   **10**

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