ET-532(A)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

December, 2013

ET-532(A) : HYDROLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Solve **any five** questions. **All** questions carry **equal** marks. Neat sketches (well - labelled) be given.*

1. (a) Outline the main hydrological processes that contribute to surface water. 6

   (b) If n denotes the number of gram molecules in volume V, prove : 4

   $pV = \frac{M}{m} RT$, where the symbols have their usual meaning.

   (c) Define relative humidity. 2

   (d) How does vapour pressure vary, over a water body, with temperature ? 2

2. (a) What is to be understood by mesopause, and stratopause ; give a sketch. 7

   (b) Explain : 7

   (i) sensible heat ;

   (ii) scattering of solar radiation ;

   (iii) net radiation ;

   (iv) major pressure belts of our globe.

3. (a) Explain the use of *double mass curve*, vis-a-vis, the consistency of a given hydrological data at any observation station.

(b) What is understood by depth area duration analysis with respect to a station ?

(c) A data series for a given area is given below :

Stn	1	2	3	4	5	6	7
Rain fall (mm)	10.2	8.03	7.06	8.0	5.0	0	3.2
Thiessen Polygon Area $(km)^2$	2.1	3.2	3.1	2.8	9.0	6.1	5.2

Determine the average precipitation over the whole basin.

4. With the help of sketches, explain the use of slope-area method for estimating flow in a stream. 1

5. (a) With respect to the hydrograph of a basin, as recorded at a given station, explain the typical characteristics when this is the result of a storm over the basin.

(b) Giving the sketch, of discuss the velocity - area method of flow computation.

6. Given a data sample of some hydrological event, explain what is understood by : 1

(a) Binomial distribution

(b) Normal distribution

(c) Chi-sq distribution

(d) F - distribution

(e) Coefficient of correlation

With regard to a water - bearing soil, outline the following : **14**

(a) An aquifer and its types ;
(b) specific yield ;
(c) transmissivity and hydraulic resistance
(d) leakage factor ;
(e) anisotropic aquifer and its hydraulic conductivity.

Write short notes on **any four** of the following : **4x3½=14**

(a) Rational and cook's methods to find peak rate of runoff.
(b) Dickens formula
(c) Fuller's formula for estimating floods
(d) Gumbell's Probability Method
(e) Design flood
