Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester: V (CIVIL)

Regular Examination - December 2013

2CI 503 HYDROLOGY AND WATER RESOURCES ENGINEERING

Time: 3 Hours **Total Marks: 70**

Instruction: 1 **Answer to the two sections must be written in separate answer books.**
2 **Assume suitable data if required.**
3 **Figures to the right indicate full marks**

Section – I

Q.1 **(A)** Write a note on "Characteristics of precipitation in India" **(6)**

(B) Explain the method of separation of base flow from flood hydrograph. **(6)**

OR

Q.1 **(A)** Define: 1) Infiltration 2) Infiltration Capacity 3) Field Capacity4) Infiltration rate **(6)**

(B) The following table gives values of measured discharges at a stream gauging site in a year. The stream diverts 5.0 Mm^3 of water per month from its upstream for irrigation and 0.6 Mm^3 of water per month for industry from its downstream. The return flows from the irrigation and net export of the water from the basin is estimated 1.5 Mm^3 and 0.95 Mm^3.Estimate the Natural flow if the catchment area is 200 KM^2 and the average annual rainfall is 205 cm determine the runoff rainfall ratio. Ignore Change in Volume of water in the upstream reservoir of the basin.(D= Depth of gauged flow in the table below) **(6)**

Month	1	2	3	4	5	6	7	8	9	10	11	12
D(Mm^3)	3.0	4.0	2.0	0.4	2.0	8	26	27	14	11	7	4

Q.2 **(A)** Discuss Slope Area method for computing discharge of a river. **(6)**

(B) A tube well penetrates fully an unconfined aquifer. Calculate the discharge from the tube well under the following conditions: **(5)**

a) Diameter of the well=300 mm
b) Drawdown =3m
c) Effective length of the strainer under the above drawdown=10.5m
d)Co efficient of permeability of aquifer =0.5 mm/s
e)Radius of zero drawdown=300 m

OR

Q.2 **(A)** Define: Unit hydrograph and write Application, Use and Limitation of it. **(6)**

(B) List the factors affecting flood hydrograph. Discuss the role of these factors. **(5)**

Q.3 **Attempt the following:** **(12)**

(A) Explain in detail S- curve
(B) Describe the Hydrologic Cycle with neat sketch.
(C) Write short note on "Infiltrometers"

Section – II

Q.4 (A) Explain: Factors affecting runoff. (6)

(B) What are the different methods for the measurement of precipitation? Explain the I.M.D. rain gauge with neat sketch. (6)

OR

Q.4 (A) Define: flood &explain the main causes of flood and its adverse effects. (6)

(B) Draw the intensity duration curve from the following data. (6)

Duration (min)	5	10	15	30	60	90	120
Precipitation (cm)	0.8	1.2	1.4	1.7	2.1	2.4	2.8

Q.5 (A) What is a stage discharge curve? How it is affected by a changing stage of the river compared to a constant stage? (6)

(B) During a high flow, water surface elevations of a small stream were noted two sections A and B, 20 KM apart (A is upstream of B). The hydraulic properties of the sections are as under: (5)

Section	Water Surface elevation (m)	Area of Cross section (m^2)	Hydraulic radius (m)
A	75.500	104.500	2.95
B	96.545	106.745	3.05

The appropriate eddy loss co-efficient are 0.3 for gradual expansion and 0.1 for gradual contraction. Estimate the discharge in the stream assuming Manning's roughness co-efficient ,as 0.020

OR

Q.5 (A) Explain Darcy's law. What are its assumptions? Discuss its validity (5)

(B) Estimate the maximum flood flow for the following catchments by using as appropriate empirical formulas: (6)

1. A_1=50.5 km^2 for Western Ghat area, Maharashtra
2. A_2=50.5 km^2 in Gangetic plain
3. A_3=50.5 km^2 in the coarvey delta,Tamilnadu

What is the peak discharge for area A=50.5 km^2 by maximum world flood experience?

Q.6 (A) Explain Evaporation pan methods with usual sketches. (12)

(B) Write short note on: Forms of Precipitation.

(C) Write short note on: Flood control methods.

"END OF PAPER"