GANPAT UNIVERSITY

B.Tech. Semester V (CIVIL), Regular Examination – November / December: 2011

C 502: Hydrology and Water Resources Engineering

Max.Time: 3 Hours **Max. Marks: 70**

Instructions: - (1) Answer to the two sections must be written in **separate** answer books.

(2) Figures to the **right** indicate **full** marks.

(3) Assume suitable data if required.

Section - I

1 (A) Explain the procedure for plotting the depth-area-duration curves. 6

(B) Explain factor effecting transpiration losses. 6

OR

1 (A) Explain factor effecting evaporation losses. 6

(B) Describe various methods of the mean rainfall over a drainage basin. 6

2 (A) Determine the average rainfall over the catchment by Thiessen polygon method. The rainfall recorded at various rain gauge stations and areas of the Thiessen polygons are given in table. 6

Precipitation(cm)	$P_1 = 4.1$	$P_1 = 4.3$	$P_1 = 3.5$	$P_1 = 3.9$	$P_1 = 4.0$
Area (km^2)	$A_1 = 75$	$A_2 = 150$	$A_3 = 65$	$A_4 = 225$	$A_5 = 105$

(B) How precipitations affect the runoff? 5

OR

2 (A) Write short note on rain hyetograph. 6

(B) Explain Non-recording rain gauge. 5

3 (A) Give all name for computing runoff from given rainfall and explain any one in detail. 6

(B) The following are the rates of rainfall for successive 20 minutes period of a 140 minutes storm: 2.7, 2.8, 12, 8, 1.25, 1.3, 6 cm/hr. Taking the value of φ_{index} as 3 cm/hr, find out the net runoff in cm, the rainfall and the value of W_{index}. 6

Section - II

4 (A) Explain in detail 'runoff cycle'. 5

(B) Ordinates of 8 hour unit hydrograph for a drainage basin are given in table below: 7

Time(hr)	0	4	8	12	16	20	24	28	32	36	40	44	48	52
Ordinates of 8 hr unit hydrograph	0	5	28	56	92	126	178	207	165	97	25	4	1	0

OR

4 (A) Explain the procedure for plotting the depth-area-duration curves. 6

(B) Write factor effecting infiltration capacity. 6

5 (A) What is SWAT model? Which hydrological processes are occuring in SWAT model? 6

(B) Write down advantages and disadvantages of dikes. 5

OR

5 (A) Describe non-structural methods of flood control. 5

(B) Define following aquifer properties. Porosity, Specific Yield, Coefficient of permeability 6

6 (A) A 40 cm diameter well completely penetrates a unconfined aquifer of saturated depth 40 m. After a long period of pumping at a steady rate of 1500 Lpm, the drawdown in the two observation wells 25 and 75 m from the pumping well were found to be 3.5 and 2.0 m respectively. Determine the transmissivity of the aquifer, what is the drawdown at the pumping well? 4

(B) Define flood routing. Describe in brief reservoir routing and channel routing. Also differentiate between hydrologic and hydraulic design. 4

(C) Define following terms related to wells. Cone of depression, drawdown, radius of influence 4