Roll No. .....

24292

B. Tech 5th Sem. (Civil Engg) Xi

Examination – December, 2013

Hydrology

'F' Scheme

Paper:CE - 311-F

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all. Question No.1 is ***compulsory*** and hence attempt ***one*** question from each section. All questions carry equal marks. Answer should be brief, lucid with neat sketches wheresoever necessary, Use of strange tables are allowed assume missing data wheresoever necessary.

1. Answer the following statements appropriately

10×2=20

(i) The percentage of total quantity of fresh water in the world available in lequid form is .....

(ii) A plot between rainfall intensity versus time is called .....

(iii) A hyetograph is a plot of .....

(iv) An isohyet is a line joining points having .....

(v) Wind speed is measured with .....

(vi) Lysimeter is used to measure .....

(vii) A stilling well is required when the stage measurement is made by employing a .....

(viii) Direct run -off is made-up of.....

(ix) Virgin flow is .....

(x) Explain rainfall excess.

SECTION – A

2. (a) What are the different characteristics of precipitation in India ? 8

(b) A catchment has six rain-gauge stations. In a year the annual rainfall recorded by the gauges are as follows :

Station	A	B	C	D	E	F
Rainfall (CMS)	82.6	102.9	180.3	110.3	98.8	136.7

For 10% error in estimation of mean rainfall, calculate the optimum number of stations in the catchment. 12

3. (a) Explain the following relationships 12

(i) Depth-Area relationship

(ii) Maximum depth-Area- duration curve

(iii) Probable maximum precipitation over a basin

(iv) Intensity duration frequency relationship

(b) Calculate the average rate of input of how many cumecs of water will generate in area of 200 sq.km. if 2.5cm rainfall occurs in a day. 8

SECTION – B

4. (a) Discuss the factors that affect the evaporation from a body

(b) A reservoir has surface area of 250 hectares. The average values of climatic parameters are

(i) Water temperature = 20° C

(ii) Relative humidity = 40 %

(iii) Wind velocity at 1.0 m aboxe ground surface

$$= 16 \frac{km}{hr.}$$

(iv) Saturation vapour pressure = 17.54 mm of Hg

Estimate average daily evaporation from the lake and volume of water evaporated from lake in a week use any method. 20

5. (a) How will you measure the infilteration characteristics of a soil at a given location ? Explain by Hydrograph analysis

(b) It is said that in hydrological calculations of floods constant value of infilteration rates during its duration is used. Is it so ? If so, explain appropriately

10 + 10 = 20

SECTION – C

6. (a) What do you mean by Run - off ? How is it classified explain briefly.

(b) Monthly rainfall values of 50 % dependable year at site selected for construction of an irrigation tank is given below. Estimate the monthly and annual. Run off volume for a catchment area of 1500 hectares.

Month	June	July	August	September	October
Monthly rainfall (MM)	90	160	145	22	240

Use strange tables.

10 + 10 = 20

7. Given below are the ordinates of a 6-h unit hydrograph for a catchment. Calculate the ordinates of direct run off hydrograph (DRH) due to a rainfall excess of 3.5 cm occurring in 6 Hours.

Time (h)	0	3	6	9	12	15	18		48
UH ordinate (m^3/sec	0	25	50	85	125	160	185	168	25

Time (h)	54	60	69	
UH ordinate (m^3/sec	16	8	0	

20

SECTION – D

8. (a) Explain the following :

(i) Perched water table

(ii) Specific yield

(iii) Recharge

(iv) Intrinsic permeability

(v) Bulk pore velocity

(b) What are the limitations of Darcy's Law ? A falling head permeability test was conducted to over soil sample. The stand pipe had x- sectional area of 1.50 cm^2 and water was allowed to fall from 100 cm to 50 cm in one minute. For soil sample of 4 cm dia, 30 cm long, calculate coefficient of permeability. 10 +10 = 20

9. A 30 cm diameter well is drilled into a confined aquifer of permeability 45 m/day. It has 20 m long strainer and drawdown under steady state of pumping is 3.0 m with 300 m radius of influence.

(a) Calculate yield of well.

(b) Draw neat diagram of the well. 10 +10 = 20