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SE-8262

B. E. - III (Sem. V) (Civil) Examination

May / June - 2011

Hydrology & Water Resources Engineering

(New Syllabus)

Time : **3** Hours] [Total Marks : **100**

Instruction :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 3 (SEM. 5) (CIVIL)

Name of the Subject :

☛ HYDROLOGY & WATER RESOURCES ENGINEERING (NEW)

☛ Subject Code No. : 8 2 6 2 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figures to the right indicates full marks.

(4) Draw figure wherever necessary.

(5) Assume data wherever necessary.

1 (a) Define infiltration capacity and infiltration rate, what are the factors affecting infiltration capacity. 8

(b) Write the steps of constructing Theissen polygon, find out the average precipitation by arithmetic and theissen polygon method for the following figure.

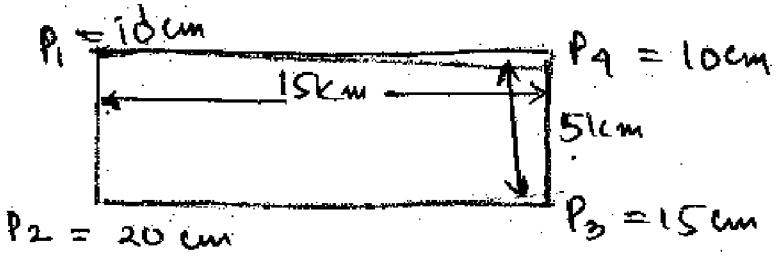

Fig.

where p_1, p_2, p_3 and p_4 are the precipitation measured at the respective for rain gauge.

2 (a) What are the factors affecting evaporation and discuss there preculative measures ? 7

(b) Discuss the environmental aspect in water resources planning. 7

OR

(b) Compare automatic and non-automatic reingauge. Explain float type reaingauge 7

3 Attempt any **three** : **7×3=21**

(1) What do you understand by flow duration curve ? Explain how to construct the curve and its utility in hydrology.

(2) State the assumptions and limitation of unit hydrograph.

(3) Discuss the importance of hydrology in water resources engineering project.

(4) The ordinate of a 2 hr unit hydrograph are given as below

Time (hr)	0	2	4	6	8	10	12	14	16
U H (m^3/sec)	0	6	8	10	12	10	6	3	0

Find the ordinate of a 6 hr unit hydrograph for the some basin.

(5) Explain hydrological cycle with a neat sketch. Write the hydrologic equation explaining the terms.

4 (a) Derive Thiem's formula for confined aquifer as given below : **10**

$$Q = \frac{2\pi KW\left(h_2 - h_1\right)}{2 \cdot 3 \log_{10}\left(\frac{r_2}{r_1}\right)}$$

Where $Q \rightarrow$ discharge through the main cell

$H \rightarrow$ height of confined aquifer.

r_1 and r_2 are the distance of well 1 and 2 from the main well respectively.

h_1 and h_2 are height of water in the well 1 and 2 respectively.

(b) A 30 cm diameter well penetrates 25 M below the static water table. After 24 hours of pumping @ 5400 litres/min the water table in a test well at 90 m is lowered by 0.53 M and in a well 30 M away the draw-down is 1.11 M. 8

(i) What is the transmissibility of the aquifer ?

(ii) Also determine the drawdown in the main well.

5 Attempt any **two** : **14**

(1) Explain principle components of a hydro electric scheme. Discuss the utility of each scheme.

(2) Define flood routing. What are the uses of flood routing ?

(3) Explain how storage capacity of a reservoir is fixed.

6 Attempt any **three** : **18**

(1) Distinguish between

(a) Confined and unconfined aquifer

(b) Channel routing and Reservoir routing

(2) Explain the various causes of flood.

(3) Explain drought and drought management.

(4) Explain with neat sketch storage zone of a reservoir.