

COLLEGE OF ENGINEERING PUNE

Test: End Semester Examination

Subject code: CE - 313

Name of subject: WATER RESOURCE ENGINEERING-I

Programme: T.Y. B. Tech. (Civil)

Year: 2012-13

Duration: 3 hrs

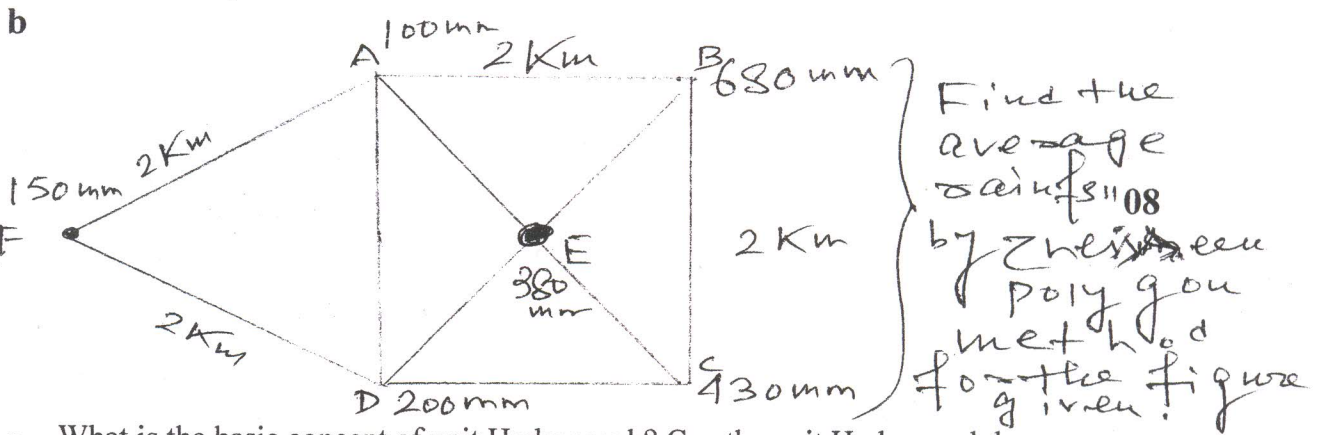
Date: 30/04/2013

Max. Marks: 50

Instructions:

1. All questions are compulsory.
2. Draw neat figures wherever required
3. Assume suitable data if necessary
4. Use of scientific calculator is allowed
5. Figures to the right indicate full marks

Q.1. a What do you mean by Hydrologic Cycle? Draw the Hydrologic Cycle and show the different parts of it. 02



Q.2 a What is the basic concept of unit Hydrograph? Can the unit Hydrograph be trapezoidal in shape? What are the main components of a Unit Hydrograph? 04

b For the unit hydrograph over an area of 12345 square kilometers what will be the volume of water in TMC? 04

Q.3 a What do you mean by area-velocity method? Discuss about it with relevant sketches. 04

- b Determine the frequency of irrigation for the crop for the following data. 04
- i) Depth of root zone= 75 cm
  - ii) Specific Gravity of soil= 1.6
  - iii) Field Capacity = 28%
  - iv) Wilting Coefficient = 11%
  - v) Consumptive Use- 19 mm/day
  - vi) Readily Available Moisture is 72% of the available moisture.

Q.4 a A well penetrates fully confined aquifer of 12 metres thickness (saturated thickness) having coefficient of permeability 0.0003 m/sec. The radius of the well is 150 mm. There is a drawdown of 4m at the well face and its radius of influence is 500m. Calculate the steady state discharge which can be withdrawn 04

from this well. What will be the percentage increase in the discharge if the radius of the well is doubled?

- b** Calculate the discharge of fully penetrated tube well (in confined aquifer) if the tube diameter is 44 cm, aquifer thickness is 22 metres and the coefficient of permeability of the aquifer is  $5.555 \times 10^{-1}$  mm/sec. Consider the radius of influence as 150 metres.

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- Q.5. a** The yield of water from a catchment area during each successive month is given below. Determine the capacity of a reservoir required to allow the above volume of water to be drawn off at a uniform rate assuming that there is no loss of water over the hydraulic structure. Data is given below in tabular form. All the given figures in the second row are the discharges for the corresponding month in million metre cube.

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Jan	Feb	March	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.3	2.2	2.8	8.6	11.9	12.2	9.7	8.8	2.5	1.9	1.7	1.2

- b** The stage of a river was observed on a day as given below. The rating curve for the above gauging station is given by the equation  $Q = 20 (Y - 260)^{1.8}$  Where Q is the discharge in  $m^3/s$ . and 'y' is the stage (R. L.) in metres. Calculate the total volume in million metre cube and the mean flow.

Time (Hr)	8	12	04	08	12	04	08
Stage (RL) in metres	262.8	264.2	266.8	268.6	266.4	264.3	262.6

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- Q.6. a** What do you mean by Thiem's formulae for confined and unconfined aquifers? Derive both the formulae for obtaining the discharges of confined and unconfined aquifers.

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- b** Determine the spacing of the tile drain from the data given below.

- i) Annual rainfall = 100cm
- ii) Drainage coefficient = 1% to be drained in 24 hours
- iii) Depth of impervious layer from the surface = 10m
- iv) Depth of highest position of the water table below the land surface = 1.5m
- v) Depth of drain below land surface = 2.0m
- vi) Permeability of the soil =  $6 \times 10^{-6}$  m/s

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