Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

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CE-602

B.E. VI Semester

Examination, June 2017

Water Resources and Irrigation Engineering

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Any missing data may be suitably assumed, if any.

1. After how many days will you supply water to soil (clay loam) in order to ensure efficient irrigation of the given crop, if
   a) Field capacity of soil = 27%
   b) Permanent wilting point = 14%
   c) Dry density of soil = 15 kN/m^3
   d) Effective depth of root zone = 75 cm
   e) Daily consumptive use of water for the given crop=11 mm.

2. A tube well is used to irrigate rabi crop to cover an area of 0.2 hectare. The discharge from the well is 0.04m^3/sec. The average depth of flow of the crop is expected to be 10cm with an infiltration of 4cm/h, find the time required to irrigate and the maximum area that can be irrigated.

3. What is Water Logging? What are the ill-effects of water logging? State the methods to improve the sub-surface drainage.

4. In an artesian aquifer of 8 m think, a 10 cm diameter well is pumped at a constant rate of 100 lit/minute. The steady state drawdown observed in two wells located at 10m and 50m distances from the centre of the well are 3m and 0.05m respectively. Compute the transmissivity and the hydraulic conductivity of the aquifer.

5. A 6 h storm produced rainfall intensities of 7, 18, 25, 12, 10 and 3 mm/h in successive one hour intervals over a basin of 800 km^2. The resulting runoff is observed to be 2640 hectare meters. Determine φ-index for the basin.

6. The ordinates of 3 hour unit hydrograph are given below:

Time in hour	0	3	6	9	12	15	18	21	24	27	30
Ordinates in m^3/sec.	0	10	25	20	16	12	9	7	5	3	0

Find the ordinates of a 6 hour unit hydrograph for the same basin analytically. Also sketch this unit hydrograph. What is the peak value of discharge in this unit hydrograph?

7. Design an irrigation canal by Kennedy's theory which is to carry a discharge of 5 cumecs. Assume N = 0.0225, m=1.0, B/D=3.24, side slope = ½ : 1. Find also the bed slope of canal.

8. Answer any four of the following:
   a) Explain the relation between duty, delta and base period. Derive the relation between them and state the methods to improve duty of water.
   b) Enlist different types of tube wells and dug wells. Explain common types of strainer with a neat sketch.
   c) What are the design applications of the depth-area-duration relations? Explain the procedure of developing these relations.
   d) What are the canal losses? Explain with the available empirical equations.
   e) Define flood routing. What are the uses of flood routing?
   f) What are the methods of estimating design flood? What are their limitations?

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