M. TECH.-I (CIVIL-HYDRAULIC ENGINEERING) (CBCS – 2015 COURSE) : WINTER - 2017

SUBJECT: IRRIGATION WATER MANAGEMENT

Day: **Wednesday** Time: **11.00 AM TO 02.00 PM**

Date: **17/01/2018** **W-2017-2773** Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer book.

SECTION-I

Q.1 **a)** What are the basic physical properties that influence the soil- water relationship? Explain in detail. **(05)**

b) What is soil water constant? Enumerate the different soil water constants giving their characteristics. **(05)**

OR

Q.1 **a)** What is field capacity of soil? Explain the field method of determining the field capacity of soil. **(05)**

b) What is the estimation of water requirement of crops? Explain one of the estimation methods. **(05)**

Q.2 **a)** What is surface irrigation? Give its advantages and disadvantages. **(05)**

b) What is the check method of irrigation? Give a sketch layout plan of method. **(05)**

OR

Q.2 Workout the capacity of sprinkler system to apply water at the rate of 1.5 cm/ h. Two sprinkler lines 200 m long each with 18 sprinklers are spaced at 11 m interval on each line. The sprinkler lines are spaced at 16 m interval. **(10)**

Q.3 Compute the time required to irrigate a square area of 4 ha to depth of 5cm with two movable laterals 200 m long each fitted with 16 sprinklers at an interval of 13 m on each lateral. A sprinkler applies 1.25 cm of water per hour and the laterals are spaced at 20 m interval. Five hours are required to move the laterals each time. **(10)**

OR

Q.3 Find out the time required to irrigate a border of 150 m long and 10 m wide with a stream of 25 lit/sec. The irrigation is applied at 50% soil water availability. The depth of root zone is 75 cm and bulk density of the soil 1.52 g/cm^3 . Available water holding capacity of the soil is 18%. **(10)**

P. T. O.

SECTION-II

Q.4 **a)** What are the various methods of measurement of water flow? Explain one of the methods in detail. **(05)**

b) Find out the theoretical velocity of water jet flowing through a square orifice in a large tank when the centre of the orifice is 60 cm below the water surface. **(05)**

OR

Q.4 **a)** What are the principles and procedures of water flow measurement by tracer method? **(05)**

b) Compute the discharge in liters/ second over a 90^0 triangular weir if the depth of water flowing over the weir is 15 cm measured at a point of 2 m upstream. **(05)**

Q.5 **a)** What are the factors that govern the time of irrigation to crops? Explain. **(05)**

b) How do the soil characteristics influence the frequency, interval and depth of the irrigation? **(05)**

OR

Q.5 **a)** What is the procedure of deciding the critical stages of water need of a crop? **(05)**

b) What is the difference between Surface water distribution system and Under ground pipeline distribution system in irrigation? **(05)**

Q.6 **a)** What does the term, Quality of irrigation water? Explain. **(05)**

b) What are various types of irrigation water based on amount and nature of salts present? **(05)**

OR

Q.6 A 5 gm soil sample on chemical analysis shows that is has 2.5 milli-equivalents of exchangeable cations and 1.25 milliequivalents of exchangeable sodium ions. Determine the cations exchange capacity in me/ 100g soil and the exchangeable sodium in percent. **(10)**

* * * *