Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐

Total No. of Questions: 09   **Total No. of Pages: 02**

B. Tech. (CE) (Sem. 4)
IRRIGATION ENGINEERING-I
Subject Code: BTCE-405
Paper ID: A1175

Time: 03 Hrs.   **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1.   **Section A is COMPULSORY consisting of TEN questions carrying TWO marks each.**

2.   **Section B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**

3.   **Section C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION A

1.   Define:

   a)   List any four objectives of irrigation

   b)   List any four major disadvantages of irrigation?

   c)   What is meant by crop-ratio?

   d)   What do you understand by balancing depth?

   e)   State Lacey's silt theory

   f)   What is meant by water logging?

   g)   What is meant by a multipurpose project?

   h)   How do you differentiate between major, medium and minor projects?

   i)   Define specific retention of a well

   j)   What is meant by rehabilitation of a tube well?

SECTION B

2.   What is meant by duty of water? What are the factors which influence duty?

3.   Design an irrigation canal to carry a discharge of 40 cumec with a bed slope of 1 in 4000. Kennedy's critical velocity ratio is 0.85 and Kutter's n= 0.025. Take side slopes of 1:1.

4. Establish the economical feasibility of lining of an existing earthen canal for the data given below;

Estimated cost of C.C lining	= Rs 50 crores
Seepage water saved	= 30 cumec
Average duty for the crops	= 1600 ha/cumec
Annual net income per hectare	= Rs 1500
Interest on capital	= 12%
Useful life of lining	= 30 years
Annual operation and maintenance cost	= 2%

5. In a drainage system, closed drains are placed with their centers at 2 m below the ground surface. The highest position of water table is 1.75 m below the ground surface. If the impervious layer is at depth of 5 m below the ground surface, determine the spacing of the drains. Take $k = 1 \times 10^{-5}$ m/s, average annual rainfall = 60 mm.

6. Establish the relationship between hydraulic conductivity and coefficient of transmissibility in an aquifer system

SECTION C

7. Derive the formula for discharge of a well in a homogeneous unconfined aquifer. State the assumptions on which the formula is based. Also, state the limitations.

8. Discuss the classification of river training works. Explain the design considerations of guide banks

9. Write notes on
   (i) Regime channel
   (ii) Storage capacity of an aquifer
   (iii) Land drainage
   (iv) Rehabilitation of tube well