

Enrollment No: \_\_\_\_\_ Exam Seat No: \_\_\_\_\_

# C.U.SHAH UNIVERSITY

## Winter Examination-2018

**Subject Name:** Irrigation Engineering

**Subject Code:** 4TE05IRE1

**Branch:** B.Tech (Civil)

**Semester:** 5 **Date:** 07/12/2018

**Time:** 10:30 To 01:30

**Marks:** 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

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- Q-1 Attempt the following questions: (14)**
- a) Define water use efficiency. 01
  - b) Define permanent wilting point. 01
  - c) Define Kor depth. 01
  - d) Define Crop ratio. 01
  - e) Define gravitational water. 01
  - f) Enlist various types of irrigation canals. 01
  - g) What are alluvial channels? 01
  - h) What do you understand by the lining of canals? 01
  - i) What is land reclamation? 01
  - j) Enlist various causes of salinity and alkalinity in soils. 01
  - k) Define aquicludes. 01
  - l) Enlist different types of tube well. 01
  - m) What is the development of a tube well? 01
  - n) What is pitched bank? 01
- Attempt any four questions from Q-2 to Q-8**
- Q-2 Attempt all questions (14)**
- (a) Write brief notes on benefits and ill-effects of irrigation. 05
  - (b) The field capacity of a certain soil is 15% and the moisture content of the soil before irrigation is 8%. Determine the depth up to which the soil profile will be wetted with an application of 60 mm of water. Take dry unit weight of soil as  $15.0 \text{ kN/m}^3$ . 05
  - (c) Differentiate between sprinkler irrigation and drip irrigation 04
- Q-3 Attempt all questions (14)**
- (a) Enlist different methods of irrigation. Explain, with neat sketch, 'Furrow method'. What are the factors which decide the spacing between the furrows? 07
  - (b) Explain the terms (i) Duty (ii) Delta and (iii) Base period. Derive the relation between Duty, Delta and Base period. 07
- Q-4 Attempt all questions (14)**
- (a) What are the drawbacks of Lacey's silt theory? 07
  - (b) A water course has culturable commanded area of 2600 hectares, out of which the intensities of irrigation for perennial sugar cane and rice crops 07



are 20% and 40% respectively. The duty for these crops at the head of water course are 750 ha/cumec and 1800 ha/cumec respectively. Find the discharge required at the head of water course if the peak demand is 20% higher than the average requirement.

- Q-5** **Attempt all questions** **(14)**
- (a) Explain Dupuit's theory for unconfined and confined aquifer. 07
- (b) Design an irrigation channel in alluvial soil according to Lacey's silt theory using following data: 07
- Full supply discharge =  $15 \text{ m}^3/\text{sec}$   
 Lacey's silt factor = 1.0  
 Side slope = 0.5 : 1
- Q-6** **Attempt all questions** **(14)**
- (a) Describe the method of design of a lined canal. 07
- (b) Design a lined canal to carry  $100 \text{ m}^3/\text{s}$  on a slope of 1 in 2500. The maximum permissible velocity is 2 m/s,  $N = 0.013$  in Manning's formula and the side slope is 1.25 H : 1.0 V. 07
- Q-7** **Attempt all questions** **(14)**
- (a) Write a note on water logging and remedial measures to prevent it. 07
- (b) What are the various drainage systems? Give advantages of open drains. 07
- Q-8** **Attempt all questions** **(14)**
- (a) Explain the investigation process used for project preparation and which data is collected for investigation in irrigation project. 07
- (b) Discuss the salient features of the design of guide banks. 07

