7E7061

Roll No. _____

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7E7061

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021

Civil Engineering

7CE1A Water Resources Engineering - I

Time: 2 Hours

Maximum Marks: 48
Min. Passing Marks: 15

Instructions to Candidates:

*Attempt **three questions,** selecting **one question each** from any three unit. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) Write short notes on the following - [8]

(i) Consumptive use of water

(ii) Water harvesting

(iii) Contour farming

(iv) Crop rotation

(b) Define field capacity and permanent wilting point. The root zone of a crop in a certain soil has a field capacity of 40% and permanent wilting point of 12%. Determine the depth of moisture in the root zone per meter at the field capacity and at the wilting point. Also find the available depth of water if the root zone depth is 1.3 m. Take the dry unit weight of soil as 15 kN/m^3. [8]

OR

Q.1 (a) Describe various water losses in irrigation channels. [8]

(b) Determine the discharge of a distributary at the tail end from the following data - [8]

Gross commanded area = 20,000 ha

Culturable commanded area = 70% of GCA

Losses beyond the tail end = 1.0 cumecs

Kharif (rice) Intensity of irrigation = 15%

Kor depth = 19 cm

Kor period = 2.5 weeks

Rabi (wheat) Intensity of irrigation = 30%

Kor depth = 13.5 cm

Kor period = 4.0 weeks

Sugarcane Intensity of irrigation = 10%

Kor depth = 16.5 cm

Kor period = 4.0 weeks

UNIT-II

Q.2 (a) Compare Kennedy's and Lacey's theory for the design of the channel. What are the drawbacks of both theories? [8]

(b) Design an irrigation channel to carry a discharge of $50 m^3/s$ by Kennedy's theory. Assume m = 1.0, N = 0.025 and slope of channel as 1 in 5000. [8]

OR

Q.2 (a) Write short notes on the following - [8]

(i) Warabandi and Jamabandi

(ii) Silt control in channel

(iii) Estimation of channel losses

(iv) Role of Command Area Development

(b) Design an irrigation channel using Lacey's theory for a discharge of 22 cumecs and silt factor = 1.0. [8]

UNIT- III

Q.3 (a) Discuss various types of outlets. Also describe the criteria for selection of outlet capacity. [8]

(b) Describe various types of river training works. Draw neat sketches of Guide banks and spurs. [8]

OR

Q.3 (a) What do you understand by critical tractive force? Explain initial and final regime conditions of channels. [8]

(b) Describe the functions of a distributary head regulator and cross head regulator. [8]

UNIT- IV

Q.4 (a) Describe various types of tube wells. [6]

(b) For the strata shown in Fig 4 (b) design a tube well. The average level of the water table below the ground surface is 15 m in summer and 12 m in winter and the discharge required is 100 l.ps. The maximum depression head = 10.0m. Take the radius of influence as 400 m. [10]

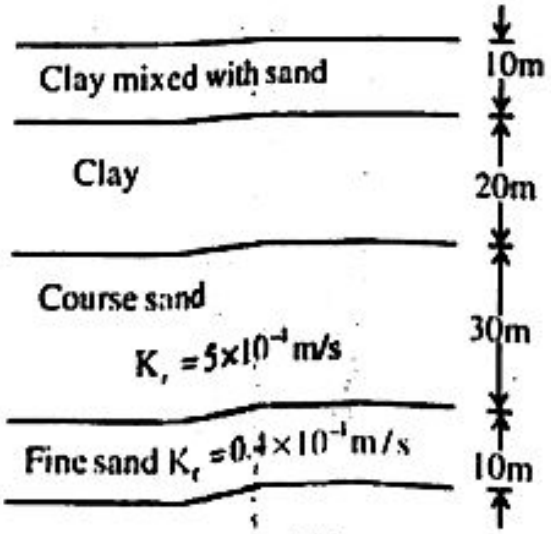

Fig.-4(b)

OR

Q.4 (a) Describe various types of channel lining. [8]

(b) Describe various measures for prevention of water logging. [8]

UNIT- V

Q.5 (a) Write a short note on Hydrologic cycle and factors affecting runoff. [8]

(b) Describe various types of rain gauges for the measurement of rainfall with simple sketches. [8]

OR

Q.5 (a) Describe the rational method for estimation of runoff. [8]

(b) Describe the theory of unit hydrograph. Explain the method of derivation of a unit hydrograph from and isolated storm hydrograph. [8]