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Total Number of Pages: 02

Course: B.Tech
Sub_Code: PCI6I102

6th Semester Back Examination: 2022-23

SUBJECT: Irrigation Engineering

BRANCH(S): CIVIL

Time: 3 Hours

Max Marks: 100

Q.Code: M190

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

Part-I

Q1 Answer the following questions:

(2 x 10)

- Differentiate between GCA and CCA. Also, define the intensity of irrigation.
- What is the consumptive use of water?
- What is the significance of duty, and mention two measures to improve duty?
- Why is the lining of the canal done? Also, mention types of lining commonly adopted.
- What are the methods of reclamation of saline land?
- What is a divide wall, and what is its function of it?
- What is the exit gradient? Why is it advisable to limit the hydraulic gradient within the exit gradient?
- What is hydrodynamic pressure? Write the expression of it.
- What is the difference between high and low dams?
- What are Uplift force and Drainage Gallery

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)

(6 x 8)

- Explain the advantage and disadvantages of sprinkler irrigation systems.
- Explain the terms: field capacity, permanent Wilting Point, Kor period, Base period and Crop period.
- Explain the term "Water logging"? How to control waterlogging?
- Explain various canal alignments with sketches.
- Explain the cost-benefit analysis carried out in justifying the lining of the canal.
- Using Lacy's theory, design an irrigation channel to carry 50 cumecs of discharge. Take the silt factor as 1.10.
- Draw the layout of diversion head works and briefly discuss the different components.
- Explain Bligh's theory and its application to make a safe foundation against the ill effects of the piping and uplift pressure.
- What are canal falls? Discuss with neat sketches the various types of canal falls.
- Explain different major forces act on a gravity dam.

- k) Describe different modes of failures of concrete gravity dams with criteria for structural stability.
- l) With neat sketches, describe the difference between Silt Excluder and Silt ejector.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** a) After how many days will you supply water to the soil to ensure efficient irrigation of the given crop if the (i) Field capacity of soil = 35%, (ii) Permanent wilting point = 15%, (iii) Density of soil = 1.5 g/cm^3 (iv) Daily consumption use of water for the given crop = 12 mm. (v) Effective depth of root zone = 80 cm. (8)
- b) What is the consumptive use of a crop? Explain the Blaney-Criddle equation for consumptive use. Compare it with Penman's equation. (8)
- Q4** a) With neat sketches, discuss all types of cross-drainage works. Also, classify different types of aqueducts based on the materials used in construction. (8)
- b) Write the difference between Kennedy's and Lacy's theory for designing a stable channel. (8)
- Q5** a) Describe all the causes of the failure of the earthen dam. (8)
- b) Distinguish clearly between a low gravity dam and high gravity dam. Derive an expression used for such a distinction. Determine the critical height of a gravity dam, taking the specific concrete gravity as 2.35 and allowable compressive stress as 3345 KN/m^2 . (8)
- Q6** a) A 100 m height concrete gravity dam trapezoidal in cross-section has an upstream face vertical, crest width of 6 m, base width of 75 m and free board equal to 4 m. Calculate the maximum principal stress at the toe when the reservoir is full. Take the unit weight of concrete as 23.5 KN/m^3 . Consider only self-weight, hydrostatic water pressure, and uplift pressure. There is no drainage gallery and tailwater. (8)
- b) Describe seepage control in an earthen dam. (8)