

[Total No. of Questions - 9] [Total No. of Printed Pages - 4]

Dec.-23-0547

CE-703 (Irrigation and Design of Hydraulic Structures)
B.Tech, 7th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question each from sections A, B, C and D. Section E is compulsory.

SECTION - A

1. What is meant by "Border Flooding" and how it is different from "Check Flooding" and "Free Flooding"? (10)
2. (a) "All the waters are not fit for the irrigating crops". Analyze critically. (5)
(b) What are the benefits that can be accrued from the irrigation projects? (5)

SECTION - B

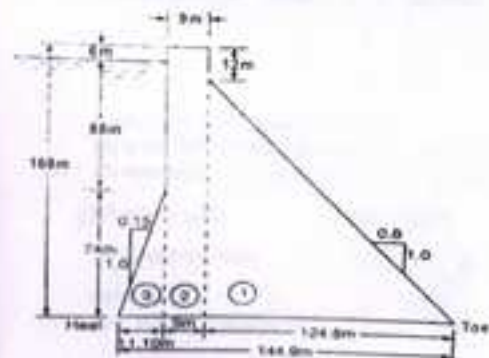
3. Compute the frequency of irrigation required for optimum growth of a certain crop with data given below:
Root zoon depth=70cm
Field capacity = 28%
Wilting Point = 13%
Dry density of soil = 1.3gm/cc
Consumptive use = 12mm/day
Assume any other data not given. (10)
4. Write a note on Consumptive Use and its estimation. (10)

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SECTION - C

5. What are different components of spillway and how is the profile of ogee spillway evolved? (10)
6. Below Figure shows the section of a concrete gravity dam. Examine the stability of the dam against
(a) Overturning (b) Compression (c) Tension and (d) Sliding
Following combination of forces is to be considered:
(i) Hydrostatic forces when dam is full and there is no water d/s
(ii) Uplift forces
(iii) Earthquake forces with upward vertical acceleration of 0.05 g and downstream horizontal acceleration of 0.1 g
(iv) Weight of dam
Neglect all other forces
Following data is also given: Shear strength: 35 kg/sq. cm, coefficient of friction μ : 0.75, weight of concrete: 2400 kg/m³
Assume any missing data. (10)



[P.T.O.]

SECTION - D

7. Design Sarda type fall with following data (Assume missing data, if any)
- | | |
|---------------------------------|-------------------|
| Full supply discharge u.s./d.s. | 50 cumecs |
| Full supply level u.s./d.s. | 101.50 m/100.00 m |
| Full supply depth u.s./d.s. | 2.0 m |
| Bed width u.s./d.s. | 30 m |
| Bed level u.s./d.s. | 99.50 m/98.00 m |
| Drop | 1.5 m |
| Side slopes | 1:1 |
| Soil | Good Loam |
| Safe exit gradient | 1/4.5 |
- Design the floor with Khosla's Theory. (10)

8. Explain different components of Diversion Headworks and draw a typical layout of a diversion headwork. (10)

SECTION - E (Compulsory)

9. Answer the following questions in brief.
- Explain briefly Paleo Irrigation.
 - Differentiate between Weir & Barrage.
 - Write a short note on Exit gradient and its importance.
 - Derive the relationship between Delta and Duty.
 - Write a short note on pressurized irrigation.
 - Differentiate between Field Capacity & Field Saturation.

- (g) The energy dissipation in a Sarda type canal drop is caused by
- Hydraulic jump
 - Friction blocks
 - Water Pool
 - Baffle wall
- (h) An elementary triangular concrete gravity dam, supporting 60 m height of reservoir water and full uplift should have a minimum base width equal to
- 36 m
 - 39 m
 - 51m
 - 61m
- (i) Which one of the following is an arch dam?
- Bhakra dam
 - Idduki Dam
 - Hirakud dam
 - None of the above
- (j) The spillway, which can be adopted with ease on Gravity as well as Earthen dams, is
- Chute spillway
 - Ogee spillway
 - Shaft spillway
 - None of the above
- (10×2=20)