(2064)

14704

B. Tech 6th Semester Examination

Irrigation Engineering

CE-6002

Time : 3 Hours　　　　　　　　　　　　**Max. Marks : 100**

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 selecting one question from each of the section A, B, C and D. All the subparts of the questions in Section-E are compulsory.

SECTION - A

1.　(a)　Discuss briefly the benefits as well as ill effects of irrigation.

　　(b)　How would you classify the soil moisture for crops? Derive an expression for depth of available water and readily available water to crops. A soil has a field capacity of 28% and the permanent wilting point of 8%. Determine the available depth of moisture of the soil if the root zone depth is 0.8m. Assume dry unit weight of soil as 15 kN/m^3.

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2.　(a)　Explain the salient features of the sprinkler irrigation system. What are the conditions for which the sprinkler irrigation is suitable? How does it differ from the drip irrigation? What is the future of drip irrigation in India?

　　(b)　Derive a relationship between duty and delta for a given base period of crop. The discharge available from a tubewell is 120m^3/hour. Assuming 3200 hours of working for a tubewell in a year, estimate the cultivable area that this tubewell can command. The intensity of irrigation is 50% and the average depth of Rabi and Kharif crops is 48 cm.

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SECTION - B

3. (a) Explain with the help of a suitable sketch, component of canal distribution system taking off from Diversion headworks.

    (b) Describe briefly the various considerations made in the alignment of irrigation channel. How would you decide the alignment of a water course?   (10+10=20)

4. (a) Compare Kennedy's theory and Lacey's theory. What are the limitations of both the theories?

    (b) A stable channel is to be designed for a discharge of 40cumec and silt factor of unity. Calculate the dimensions of the channel using Lacey's method. Also calculate the dimensions of channel if it were to be designed on the basis of Kennedy's method with m=1 and B/D ratio the same as obtained from Lacey's method.   (10+10=20)

SECTION - C

5. (a) Discuss the various measures which may be taken to prevent waterlogging as well as to relieve the land already waterlogged.

    (b) What are the qualities of a good lining materials? How for these qualities are satisfied by the cement concrete lining? Draw the sketch of cement concrete lining. (10+10=20)

6. (a) Explain the various methods for the determination of spacing of closed drains.

    (b) What are different layout plans commonly used for a closed drain system? Explain in brief the conditions under which each system is most suitable.   (10+10=20)

SECTION - D

7. (a) What do you understand by meandering? What are its causes?

(b) Describe in brief various types of groynes used for river training. Draw its section also.   (6+14=20)

8. (a) Define setting and proportionality. Derive the expression for setting of a proportional outlet if the outlet is an (i) open flume outlet (ii) orifice type outlet.

   (b) Design an open flume outlet for a discharge of 0.07 cumecs on a distributary channel with a full supply depth of 1.0m. The available working head is 0.2m. Draw the Plan and L-section of the outlet.   (10+10=20)

SECTION - E (Compulsory)

9. (a) What do you mean by eight month crop, Leguminous crop and perennial crop?

   (b) What are the factors affecting the water requirement of crops?

   (c) Define the term infiltration and consumptive use.

   (d) Explain the term base period, crop period, flow duty & quantity duty.

   (e) Differentiate between free floating and wild floating.

   (f) What do you understand by Lacey's initial regime and final regime condition?

   (g) Draw the section of canal in case of partial cutting & partial filling.

   (h) Differentiate between open drain and closed drain.

   (i) What are modular, semi modular and non modular type outlet?

   (j) What do you understand by aggrading type and degrading type rivers.   (10×2=20)