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(2125)

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B. Tech 6th Semester Examination

Irrigation Engineering (OS)

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 one question each from section A, B, C and D. Section E is compulsory. All questions carry equal marks.

SECTION - A

1. (a) Define irrigation and explain its necessity in a tropical country like India. What are the advantages and ill-effects of irrigation? (10)
- (b) The base period, intensity of irrigation and duty of various crops under a canal system are given in the table given below. Assume a time factor for canal to be 13/20, calculate the discharge required to the head of the canal. If the capacity factor is 0.8, determine the design. (10)

| Crop | Base period (Days) | Duty at the head of canal (hectares/cumecs) | Area under the crop (hectares) |
|-------------------------------------|--------------------|---|--------------------------------|
| Wheat (Rabi) | 120 | 1600 | 600 |
| Sugar-cane | 320 | 580 | 850 |
| Overlap of sugarcane in hot weather | 90 | 580 | 120 |
| Bajra (Monsoon) | 120 | 2000 | 500 |
| Vegetables (Hot weather) | 120 | 600 | 360 |

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2. (a) Explain Furrow method of irrigation in detail? Discuss the advantages of furrow irrigation as compared to other methods of irrigation. (10)
- (b) Differentiate between the following:-
 - (i) Flow and Lift irrigation. (10)
 - (ii) Sprinkler and Drip irrigation. (10)

SECTION - B

3. (a) Design a channel section using Kennedy's theory to carry a discharge of 60 cumecs, with a bed slope of 0.17 m per km. The critical velocity ratio is 1.0 and N can be taken as 0.0225, side slope is 1/2:1. (10)
- (b) Explain the procedure for the design of an alluvial channel by Lacey's theory. What are the drawbacks of Lacey's theory? (10)
4. (a) Discuss the procedure of the design of a canal section by Garrett's diagram. (10)
- (b) Explain various types of losses from a irrigation canal. How do these losses can be minimized? (10)

SECTION - C

5. (a) What do you understand by the term water logging? Explain the ill-effects of water logging. (10)
- (b) What is the necessity of drainage below the lining? Discuss the various drainage and pressure release arrangements. (10)
6. (a) What are the advantages of providing canal lining? Explain the process of providing concrete lining. (10)
- (b) What are the effects of salts on the crop? What are the main causes of salinity and alkalinity of soils? How would you reclaim a salt-affected land? (10)

SECTION - D

7. (a) Discuss various types of river training and bank protection works. (10)
- (b) Explain Meandering, Aggrading and Degrading type of rivers. (10)
8. (a) What do you understand by non-modular, semi-modular and rigid module outlets? Draw a neat sketch of Gibb's rigid module. (10)
- (b) What are the criterion for the selection of the outlet capacity? (10)

SECTION - E

9. (a) What is the cut off in a meandering river?
- (b) What is consumptive use of water?
- (c) What do you mean by earth lining?
- (d) What are the requirements of a good canal outlet?
- (e) What are the advantages of drip irrigation?
- (f) What are the impacts of irrigation on human environment?
- (g) Define non alluvial channels.
- (h) Explain the qualities of a good lining material.
- (i) What do you understand by crop rotation?
- (j) What are the different forms of duty? (2x10=20)