Code : 011852

B.Tech 8th Semester Exam., 2016

IRRIGATION ENGINEERING

Time : 3 hours   Full Marks : 70

Instructions :

(i) The marks are indicated in the right-hand margin

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Answer any *seven* questions from the following :   2×7=14

   (a) What are crop period and base period?

   (b) What is pellicular water?

   (c) What are field capacity and wilting point?

   (d) What are kor watering and kor period?

   (e) Define cash crop.

   (f) Define paleoirrigation.

   (g) Define contour farming.

   (h) What do you mean by drip irrigation?

   (i) What do you mean by contour canal?

   (j) What is incipient motion?

2. (a) Define irrigation and state the benefits and ill effects of irrigation.   7

   (b) Enumerate the different techniques of water application in the farms and explain any one of them.   7

3. (a) Define delta and duty, and establish a relation between them.   6

   (b) A channel is to be designed for irrigating 5000 hectares in Kharif crop and 4000 hectares in Rabi crop. The water requirement for Kharif and Rabi are 60 cm and 25 cm respectively. The kor period for Kharif is 3 weeks and for Rabi is 4 weeks. Determine the discharge of the channel for which it is to be designed.   8

4. (a) What is regime channel? State the Kennedy's theory of design of canal.   5

   (b) Design an irrigation channel by Lacey's theory for the discharge 50 cumec, silt factor = 1 and side slope 0·5H : 1V.   9

5. (a) Define Sodium-Absorption-Ratio (SAR) and Warabandi.   6

   (b) After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if field capacity of the soil is 26%; permanent wilting point is 13%; apparent density of soil is 1·2gm/cc; effective depth of root zone is 60 cm and daily consumptive use of water for the given crop is 10 mm? Assume additional data, if necessary.   8

6. The climatic conditions existing in a certain area at latitude 25°N during Rabi season are given below. Wheat crop is grown for which crop factor may be taken to be 0·75. Using of Blaney-Criddle method, determine consumptive use of crop; net irrigation requirement and field irrigation requirement (assume water application efficiency to be 80%) : 14

Month	Average month temp. (in °C)	Monthly % (P) of day-time hour of the year	Effective rainfall (in cm)
Nov.	19	7·39	1·5
Dec.	15	7·41	1·2
Jan.	13	7·53	2·0
Feb.	14	7·15	—

7. A stream of 125 lit/s was diverted from a canal and 100 lit/s were delivered to the field. An area of 1·8 hectares was irrigated in 8 hrs. Effective depth of root zone was 1·8 m. The runoff loss in the field was 410 cumec. The depth of water penetration varied linearly from 1·8 m at the head end of the field to 1·4 m at the tail end. Available moisture holding capacity of the soil is 20 cm per metre depth of soil. Determine water conveyance, water application, water storage and water distribution efficiencies. The irrigation was started at a moisture extraction level of 50% of the available moisture. 14

8. *(a)* What is lift irrigation and what are the advantages and disadvantages of it? 6

(b) A 30 cm diameter tube well penetrates an unconfined aquifer. During pumping test, the following data were obtained : 8

Height of static water level from bottom of aquifer = 50 m

Height of drawdown from bottom of aquifer = 45 m

Radius of influence = 300 m

Coefficient of permeability = 50 m/day

Calculate the discharge of the well.

9. Write notes on any *three* of the following : 14

(a) Crop rotation

(b) Intensity of irrigation

(c) Sprinkler irrigation

(d) Consumptive use

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