53 (CE 716) IREN

2017

IRRIGATION ENGINEERING

Paper : CE 716

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Define irrigation. What is the necessity of irrigation? Discuss in brief the benefits and ill effects of irrigation. 8

   (b) Write a note on sprinkler method of irrigation and border strip method of irrigation. 12

2. *(a)* Differentiate between 10

   (i) Syphon aqueduct and canal syphon

   (ii) Aqueduct and super passage.

(b) A channel section has to be designed for the following data : 10

Discharge $Q = 30 m^3/sec$

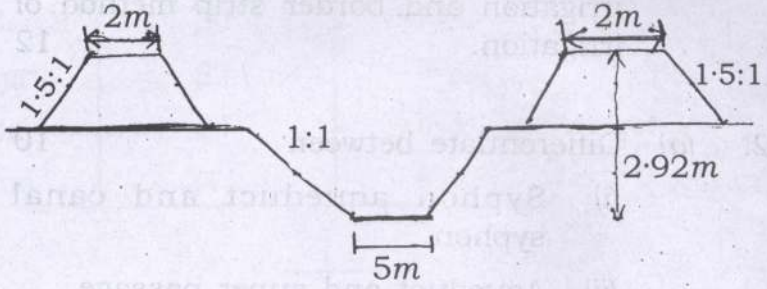
Silt factor $f = 1{\cdot}00$

Side slope $= \frac{1}{2} : 1$

find also the longitudinal slope

3. (a) Design an irrigation channel to carry a discharge of 45 *cumecs*. Assume $N = 0{\cdot}0225$ and $m = 1$. The channel has a bed slope of $0{\cdot}16m$ per *km*. 10

(b) Calculate the economical depth of cutting for the area of cross section shown in *figure*, the bed width of the channel is $5m$ and top widths of bank are $2m$. Side slope of excavation is 1:1 and of bank 1·5:1. Height of bank from bed is $2{\cdot}92m$ throughout 10



4. *(a)* What is waterlogging? Discuss briefly the various method adopted as anti-water logging measures. 10

(b) Explain Canal falls and its significance. Write brief note on Ogee fall. 10

5. *(a)* Write notes on the following: 10

(i) Free board in Canals

(ii) Inspection road

(iii) Berm

(iv) Dowla

(v) Permanent land width.

(b) Explain the term duty and delta. Derive a relationship between the two. 6

(c) Distinguish clearly between a weir and barrage. 4

6. *(a)* Write short notes on the following: 6

(i) fish ladder

(ii) Divide wall

(iii) under sluices.

(b) Explain Khosla's Method of independent variables. 6

(c) Table below gives the details for a certain Crop. Using Blaney Criddle equation and a Crop factor $k = 0{\cdot}5$ determine the following *(i)* Consumptive use *(ii)* Consumptive irrigation requirement *(iii)* field irrigation requirement if water application efficiency is 70%. 8

Month	**Avg. temp °C (Monthly)**	**Monthly % of dry time hours of the year**	**Useful Rainfall *(cm)***
Nov.	19	7·19	—
Dec.	16	7·15	1·2
Jan	12·5	7·30	0·8
Feb	13·0	7·03	0·15
March	20	7·00	—
April	22	6·5	0·3
May	24	6·3	0·6
Jun	24·2	6·00	0·7