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Subject = IRRIGATION

Qno 1(A)

Define "Delta" and Duty and derive relationship in MKS and FPS

DELTA:-

The total amount of water required to the crop, to get matures during its base period.

Total quantity of water divided by total irrigated, it obtain Della of crop of irrigated area.

Duty:-

The area of land that can be irrigated with unit volume irrigation water.

Duty means, the irrigation capacity of a unit. It is the relation between the area of crop. irrigated and quantity of irrigation water. required during the entire period.

Relation of Delta and Duty in MKS

Duty = D

Delta = A meters Base period = B days

one cumec of water Flowing continously for "B" days gives a depth of water "A" over an area of "D" hectares.

Volume of water $1 m^3 sec$ in one day = $1 \times 24 \times 60 \times 60 =$

$= 86400 m^3$

Volume of water $1 m^3 sec$ in B days = $1 \times 24 \times 60 \times 60 =$

$= 86400 m^2 m$

1 hectare = $10000 m^2$

$1 m^2 = 1/10^4 H$

Equation becomes

Volume of water $1 m^3 sec$ in B days = $86400 B m^3 =$

$= 86400 B \times 1/10^4 H.m.$ Volume of water $1 m^3 sec$ in B days = $8.64 \times BH.m$

Depth of water required by crop A = Volume / Area A

$= 8.64 \times B/D m$

Relation by Delta and duty in FPS

Duty = D (Acres/cusec)

Delta = A Feed Base period = B days by definition one cusec of water Flowing continously for B days given a depth of water "A" over an Area of "D" acres

volume of water 1ft³sec in one day = 1×24×60×60

= 86400 Ft³ = 86400 ft³ft

As 1 Acre = 43560 ft²

eqn (1)

volume of water 1ft³sec in "B" days = 86400 Ft³ =

= 86400 B × 143560 Area ft

volume of water 1ft³sec

in B days = 1.983 × B Acre ft

Depth of water required by crop A =

volume AreaA = 1.983 B AreaftD AcreA =

1.983 BDft

Qno 1(c)

Explain Indus water Treaty

Introduction:-

Singned in 1960.

Prime Minister Jawaharlal Nehru

PurPose:-

The purpose of indus water treaty is an aggrement that was made to chalk out the control over the 6 rivers that run across India and Pakistan into the Indus Basin.

River Given to India:-

Eastern rivers of India, Beas, River and sutlej with mean annual flow of 33MAF was given to India.

River Given to Pakistan:-

control of water flowing in three western river of India Indus, Chenab and Jhelum with mean annual flow of 80MAF.

Qno 1(b)

If water requires about 9cm of water after every 35 days and base period of crop in 140 Days. Find delta For wheat?

Given data:-

Depth of water = 9cm

Base Period = 140 days

Delta For wheat = ?

Solution:-

No. of watering required = 140/35 = 4

Total depth of water required = No of watering × Depth of water

= 4 × 9 = 36cm

Δ For wheat = 36cm

Qno.1(D)

Significance of Duty of Crop:-

Duty of a water simply express the number of hectare of land that can be irrigated for the full growth of the given crop.

It help us in designing an canal irrigation system.

If we know the crop area required to be irrigated and their duties.

Qno 2 (A)

Explain the Factors affecting consumptive use.

Following are Factors affecting consuptive use

Velocity of wind

Temperature

soil topography

sunlight

Humidity in air

Velocity of wind:-

Evaporation of water from land and plant surfaces takes place more rapidly when there is moving air then under calm air conditions. Hot, dry winds and other unusual wind conditions during the growth period will affect the amount of water consumptively used.

TEMPERATURE:-

The rate of consumptive use of water by crops in any particular locality is probably affected more by temperature. which for long-time periods is a good measure of solar radiation, then by any other factors.

Sunlight:-

Although latitude may hardly be called climatic factor, It does have considerable influence on the rate of consumptive use of water by various plants. The hours of daylight during the summer are much greater in northern latitudes then at Equator.

Humidity:-

Evaporation and transpiration are accelerated on days of low humidity and slowed during periods of high humidity. Greater rate of use of water by vegetation may be expected.

Soil topography :- (9)

If a soil is made more fertile through the application of manure or by some other means, the yields may be expected to increase with an accompanying small increase in use of water.

Qno 2 (B)

Wheat is to be grown at a certain place the useful rainfall For the whole season is 10cm and its cumulative consumptive use is 40cm Determine consumptive irrigation requirement (CIR) and Feild Irrigation Req (FIR). If water effeiency is 80%.

Given:-

Useful Rainfall (cm) = 10

Water application Efficiencey (η_a) = 80 % = 0.8

Commulative Consumptive use (cm) = 40cm

Required:-

Field Irrigation Requiredment (FIR) = ?

Consumptive Irrigation Requirement (CIR) = ?

By Formula,

→ Consumptive Irrigation Requirement (CIR) = Cu - Rc

= 40 - 10

CIR = 30 cm.

→ Field Irrigation Requirement (FIR) = $\frac{CIR}{\eta_a}$

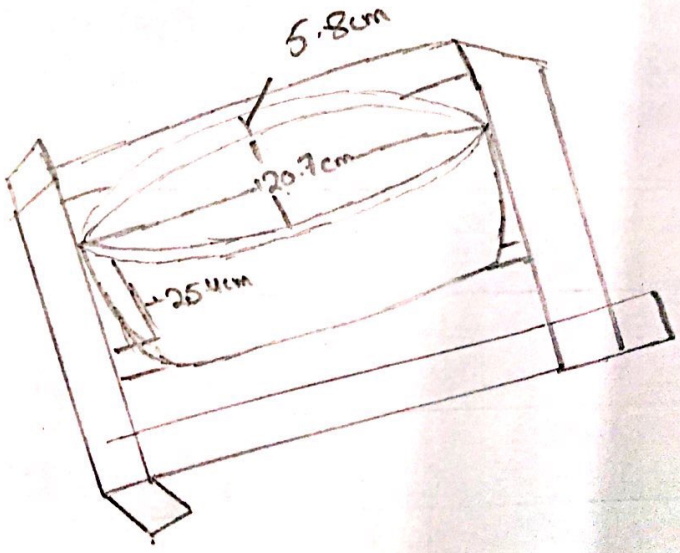
= $\frac{30}{0.8}$ = 37.5cm.

Qno 2(c)

Explain Class A Pan Evaporation (EP) measurment with the help of diagram :-

Evaporation can be experimentally determinda by directly measuring the quantity of water evaporated from this standard class A Pan.

The pan is 1.0m in diameter, 25cm deep and bottom is raised 15cm above the ground The depth of water is to kept in a fixed range such that the water surface least 5cm and never moves then 7.5cm.



Q no 2(D)

Explain crop season (Rabi and Kharif) and Kharif Rabi:-

CROP SEASON:-

The growing season is the part of year during which total weather condition i.e (rainfall and temperature).

Kharif:-

1st Apr to 31st Sept.

Rabi:-

1st oct - 31st March

Kharif crops:-

rice, maize, sorghum, Pearl, bajra etc

Rabi crop:-

Barley, Flax seed, Pea, wheat, Potato etc

Qno 3 (A)

Field capacity:-

When all gravity water has drained down to water table a certain amount of water is retained by surface soil. This water which cannot be easily drained under the action of gravity and is called field capacity.

Period of drainage = 2.5 days

F.c. is measured after 2 or 5 days

Field capacity:-

capillary water

Hygrosopic water.

Qno 3 (b)

Permanent wilting Point:

Plant can extracted water From soil till a permanent wilting is reached P.w.p is that water content at which a plant can no longer extract.

water available to plant:-

Field capacity - P.w.p. water.

Qno 3 (C)

Available and Readily available Moisture content.

Available Moisture content:-

The moisture content of the soil between Field capacity and permant wilting is terms as the available moisture. Available moisture can be expressed as percentage moistur.

Readily Available Moisture:-

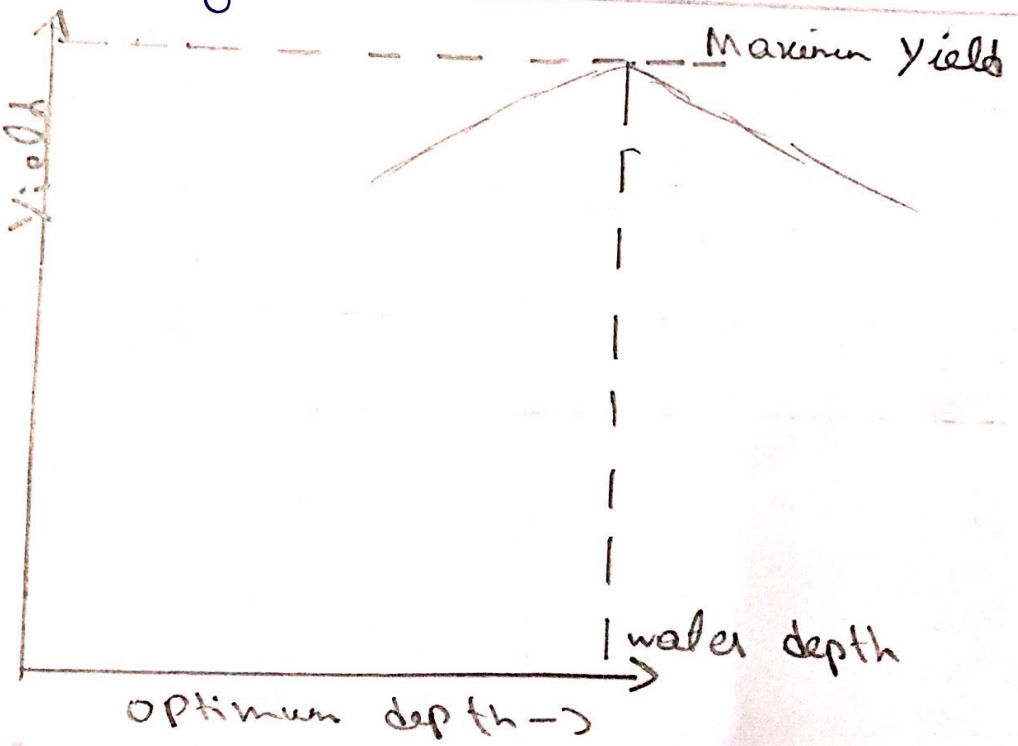
Appokimately 75 to 80% available moisture.

It is the portion of available moisture which is most easily extracted by plants.

Ans 3 (b) (16)

Optimum utilization of water:-

If a crop is sown and produced under absolutely identical conditons, using different amounts of water depths, the yield is found to vary. The yield increases with water, reaches a certain maximum value and then falls down, as shown in Figure.



Irrigation Efficiency:-

Efficiency is the ratio of water output of water to the water input and is usually expressed as Percentage.