Name :: Asfandyar Anwar

ID :: 7274

Sec :: A

Subject :: Irrigation

Submitted to :: Eng. Dr Jahangir Durrani

Q1:: Define "Delta" and Duty and devive Their relation ship in MKS and FPS System.

Ans:: Det of water:: The Depth of water in on or inched required for the crops Through out the base Period is known as delta of the crops.

Generally a crops need a certain volume of water at fixed Through out is base Period.

Scanned with CamScanner

Duty of water :-

The duty of water is the relationship between the volume of water and the area of crops it matures. — 1 cubic — ft per sec or 1 ft³/sec of water for B days matures D hectares or acress of land Then the duty of water that particular crop is D hectare comes or Dacres / Sueses.

Relationship b/w Duty and Delta in FPS system -

let

D = Duty (acres (cuss))

D = A feet base period = B day by det one case of water following continously for "B" days gives a depth "A" over an "D" acres.

Scanned with CamScanner

Volume of water (ft^3/sec) one day

$= 1 \times 24 \times 60 \times 60$

$= 86400\ ft^3/sec$

Volume of water (ft^3/sec) in B day =

$= 1 \times 24 \times 60 \times 60$

$= 86400\ B ft$

1 Acre $= 43560\ ft^2$

$1\ ft^2 = 143560$ Acre

Putting in eq ① become

$= 86400\ B \times 43560$ Acre $- ft$

Volume of water $= 1.983\ B$ Acre

ft — ①

(ft^3/sec) B day

Depth of water req by crops

$= \frac{1.983 \times B ft}{A}$

Scanned with CamScanner

Relationship b/w Duty and Delta in MKS system :

⇒ Let There be a crop of base Period B days let one comes (m^3/sec) of water be applied to this crop on the field for B days.

→ Now the volume of water applied to this crop during B day = V

$$V = (24 \times 60 \times 60 \times B)\, m^3$$
$$= 86400\, m^3$$

→ By defination of duty = $1 m^3$ of water supplied for Bday matures D hectares of land. This quantity of water (v) Mature h har of land $10^4 D m^2$ of area.

→ Total depth of water applied on this land.

Scanned with CamScanner

$= \frac{\text{Volume}}{\text{Area}} = \frac{86400}{10^4/1} = \frac{8.64B}{D}$ m

Therefore $D = 8.64$ B/mm $= 864$ B/mch

Dis duty in hater / core:

Q 16) If wheat required about 9cm of water evary 35 days and the base period or crop period of wheat is 140 days: Find out the delta for wheat:

Sol: B = 140 days

D = ?

Water req for wheat = 9cm

No of days = 35 days

by Ratio Method

D = 140 days

9cm = 35 days

Scanned with CamScanner

$35\Delta = 140 \times 9$

$\Delta = \frac{140 \text{ days} \times 9 \text{ cm}}{35 \text{ days}}$

$\Delta = 36 \text{ cm}.$

Q1) c) Explain Indus water treaty?

Indus water treaty:

The Indus water treaty (unit) is a ~~water~~ water distribation treaty between Indua and Pakistan signed on sep 19, 1960. The treaty was signed President Ayub Khan and PM J-Nehro. It was brokered by the world Bank.

The Indus water fraty deals with river indus and its five tributaries which are classified

Scanned with CamScanner

in two categories.

Eastern River	Western Rivers:
(1) Satly	1) The lan
(2) Beres	(2) Chanab
(3) Rave	(3) Indus

→ According to the Soly, all the water of eastern rivers shall be available for unrestrist use in india.

→ india should let unrestricted flow of water from western reivir to Pakistan.

→ The treaty allocated 80% of water from the six-river Indus water system to Pakistan.

→ A Permanent Indus commission was set up as a bilateral commision to

implement and Manage the treaty

Q1) write significance of Duty of a crops.

Significance of duty of a crops:

→ It help in designing efficent canal irrigation system knowing the total avilable water at the head of the main canal ~~available water~~ and the overall duty of all the crops required to be irrigated in different ~~s~~ of the ~~crops required~~ to be irrigated ~~in different~~ area which can be irrigated can be worked out.

→ Inovecely of use know the crop area required to be irrigated and their duties. we can work out the discharge required for designing the canal.

Scanned with CamScanner

Q2 a) Explain the factor affecting consumptive use.

Ans:- Factor affecting comumptive use are given below:-

① Temperature
② Humidity in air.
③ Velocity of wind.
④ Soil topgraph
⑤ Sun light etc.

① **Temperature:-**

consumptive use of water is directly affected by the temperature At high temperature the Plant tends to shoud darrang while at low temperature there is a devas totel Plant growth.

② **Humidity:-**

Evoporation is inversely

proportional to humidity as low humidity evaporation rate is more while at high humidity evaporation is showed down

3) Velocity:

Evaporation rate is more when there is move velocity as air is moving faster so there will be more evaporation, if the velocity of wind is low then rate of evaporation is also low

4) Soil Topography:

If a soil is made more fertil through the application of manure or by same other mand. The yield, may be expected to increase with an accods panying small increase in use of water however an increase

in fertile of the soil causes a deerases in the amount of water consumed per unit of coop yield.

⑤ **sunlight:**

At days in summer there is more sunlight then ~~used~~ usual so high evaporation occurs when in winter There is low evaporation rate.

Q2

b/ Given data :

usefall Rainfall (cm) = 10

water application ~~and~~ efficency (Na) = 80%

cumalative consumptive use (Cu) = 40 cm

Req : Field Irrigation Requirement (FIR) = ?

Consumptive Irrigation req (CIR) = ?

Scanned with CamScanner

Sol:-

$\Rightarrow CIR = Cu - Re = 40 - 10 = 30\ cm$

$\Rightarrow FIR = CIR / na$

$= 30 / 0.8$

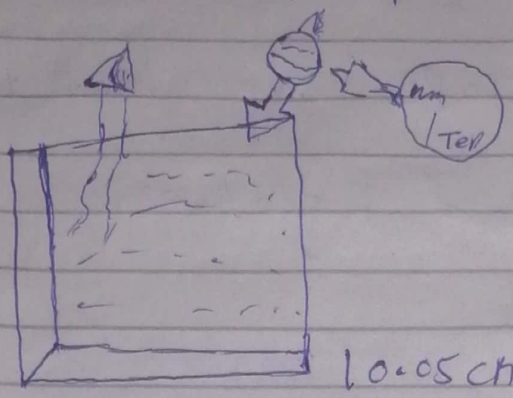
$= 37.5\ cm$

Q2) Explain class A pan evaporation (EP) Measurement with the help of Diagram:

⇒ EP can be experimently determined directly Measuring the quantity of water evaporation This standerd class a Pan: This pan is 1.0M in dia, 25cm deep and bottom is raised 15 cm above the ground surface the depth of water is to the kept in a Fixed range such that the water surface is at last 5cm and ever More then 7.5 am

Scanned with CamScanner

below the top pan



→ A Pan exaportion Ep can also determined by using the christansen formula which states

$EP = 0.459 \cdot R \cdot ct \cdot cw \cdot ch \cdot cs \cdot ce$

R = extra. Tenestrial sadiation is the same unit as

EP. in cone or mm

ct = coefficent for Temperature

cw = coeffent of wind velocity.

Q4) d) Explain crop sec (Rabi and Khanif) Khanif Rabi Ratio.

① RABT :

1 actber to 31" March

Scanned with CamScanner

winter Rabi crops:

Rabi crops are wheat Barly Gram, Mustard Roletoes

2) Khanif crops:

Khanif crops are Rice Baj ro Jawar Maize cotton:

Rabi and Khanif Ratio:

The area is irragated for Rabi crops generally More that for Kharif crops generally More than that for Kharif crops:

The ratio of Proposed Cirecased as easic to be irrigatted is Kharif season to that in Rabi season is called as Rabi and Kharif ratio. The ratio is [1:2] that is Kharif area is one half of that Rabi area.

Scanned with CamScanner

Q3) Define and explain the following

a) Field capacity: when all gravity water has drined down to water table a by surface soil This water which can not be easily drained under the action of Grawlly

b) Peunant wilting Point:

It is define as the minimum amount of water in the soil that the plant requires not to will:

c) Availble and readily available mosture content: Availble moisture content:

The difference is morsture content of the soil between capacity and Perment wilting is termed the availble moisture. Available moisture can be expresed as Perentage moisture per as Percentage pv or as depth.

Scanned with CamScanner