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sec # C

Q#1 (a) Define "Delta" and duty and derive their relationship in MKS and FPS systems:

Ans) Delta of Water:-

The depth of water in inches required for the Crops through 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.

Duty of Water:-

The duty of water is the relationship between the volume of water and the area ~~of water in Crops crops it mater~~ of Crops it mature.

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Relationship b/w Duty and delta in FPS system:-

Let D = Duty (acres/cusecs)

D = A feet base period = B day by def

One Cusec of water following Continously for "B" days gives a depth "A" on "D" acres.

Volume of Water (ft³/sec) in one day.

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

$= 86400\ ft^3/sec$

Volume of Water (ft^3/sec) in "B" days.

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

$= 86400B\ ft^3$

1 Acre $= 43560\ ft^2$

$1\ ft^2 = 143560$ Acre

Putting in eq (1) become

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

Volume of Water $= 1.983B$ Acre-ft — (2)

(ft^3/sec) B day

Depth of water required by Crops.

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(3) Relationship b/w Duty & Delta in MKS syst.

→ Let there be a crop of base period B days let one cumec (m^3/sec) of water be applied to this crop during B days = V

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

$$V = 86400\ m^3$$

→ By defination of duty - $1\ m^2$ of water supplied for B days matures D hectares of land. This quantity of water (V) mature D hac of land $10^4 D\ m^2$ of area.

→ Total depth of water applied on this land.

$$= \frac{\text{Volume}}{\text{Area}} = \frac{86000}{10^4 D} = \frac{8.64\ B}{D}\ m$$

Therefore

$$D = 8.64\ B/Dm = 864\ B/D\ cm.$$

D is duty in hecter/cume

Q11) If wheat required about 9cm of water after every 35 days and the base period or crop period of wheat is 140 days. Find out the delta for wheat?

Ans) Soln:-

B = 140 days

D = ?

Water required for wheat = 9cm

No of days = 35 days

By Ratio Method

Δ = 140 days

9cm = 35 days

$35\Delta = 140 \times 9$

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

Δ = 36 cm.

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(5)

(Q) Explain Indus Water Treaty.

Ans) The indus water treaty is a water distribution treaty b/w india and Pakistan. signed on sep 19, 1960. The treaty was signed by President Ayub khan and P.M J. Nehru. It was brokon by the World bank.

The indus water treaty deals with river and its five tributries which are classified in two categories.

Eastern Rivers	Western Rivers
1) Sutlj	4) Jhelum
2) Baraj	5) Chenab
3) Ravi	6) Indus

→ According to the tartary, all the water of western rivers shall be available for unrestrict use in indus.

→ India should let unrestricted flow of water from western river to

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

→ A permanant Indus Commision was setup as bilateral commision to implement and manage the treaty.

D) Write Significance of Duty of a Crop?

Significance of duty of a Crops:-

→ It help in designing efficient canal irrigation system knowing the total available water at the head of the main canal and the overall duty of Crops required to the irrigated in different seasons of the year the area which can be irrigated can be worked out.

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→ Inversly if u know the Crops area required to be irrigated and their duties, we can work out the discharge required for designing the Canal.

Question # 2 Part (A)

Q#2
(Part A) Explain the factor affecting Consumptive Use?

Ans) Factor affecting use are given below.

1) Temperature
2) Humicity in air.
3) Velocity of Wind.
4) Soil topography.
5) Sun lights

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Temperature:-

Consumptive use of water is directly affected by the temperature. At high temperature the plants tend to show darrange while at low temperature there is clevases tated plant growth.

Humicity:-

Evaporation is inversly proportional to humicity. as at low humicity evaporation rate is more while at high humicity evaporation is showed down.

Velocity:-

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

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4) Soil topography :-

If a soil is made more fertile through the application of manvarse or by some other means. The yield maybe expected to increase with an anors ponging small increases in we of water. However an increase in fertile of the soil. Causes a decreases in the amount of water consumed per unit of Crop field.

5) Sunlight :-

At days in Summer there is more sunlight then usual So high evaporation occurs when in winter there is low evaporated rates.

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Q# 2 Part # B (10)

Given data:

Useful Rainfall (cm) = 10.

Water application Efficiency (n_a) = 80 % = 0.8

Comulative Consumption use (C_u) = 40 cm

Required:-

(FIR) Field irrigation Requirement = ?

((IR) Consumption Irrigation requirement = ?

Sol:

$\Rightarrow CIR = C_u - R_e = 40 - 10 = \boxed{30\ cm}$

$\Rightarrow FIR = CIR / n_a$

$= 30 / 0.8$

$= \boxed{37.5\ cm}$

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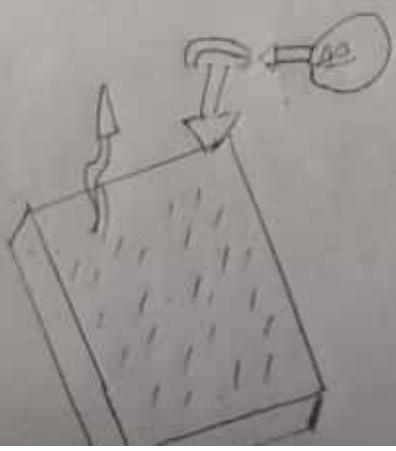
Question # 2 (c)

Part # C :- Explain Class A Pan Evaporation (Ep) measurement with the help of diagram.

Ans) → Ep can be experimentaly determined directly measuring the quantity of of water evaporation from the standard class a pan. This pan is 1.0 m in dia 25 cm deep and bottom is raised 15 cm above the ground surface the depth of water is do the kept in a fixed range such that the water surface is at least 5 cm. and ~~river~~ never more then 7.5 cm. blow the top of ~~Pan~~ pan.



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→ A pan evaporation Ep can also determined by we using the Christansen formula which ~~states~~ states.

$Ep = 0.459 \cdot R \cdot Ct \cdot Cw \cdot Ch \cdot Cs \cdot Ce$

R = extra. Tenestried Sadiation is the same unit as

EP. in cm or mm

Ct = Coefficient for Temperature.

Cw = Coefficient for wind velocity.

2d:- Explain Crop Seasons (Rabi and kharif) and kharif Rabi Ratio:

Ans) a) "RABI" :-

1 october to 31st March winter.

Robi Crop:-

Rabi Crops are wheat Barley, Gram, Mustard Potatoes

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a) Plant wilts and no longer recovers its turgidity when placed in a saturated atmosphere for 12 hours.

c) Available and readily available moisture Contents:

The difference in moisture content of the soil between Capacity and permanent wilting is termed the available moisture. Available moisture can be expressed as percentage moisture per as percentage PV or as depth.

d) Optimum of Water

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Question #3

⇒

Define and explain the following terms.

① "Field Capacity:-

When all gravity water has drained down to water table by surface soil. This water which cannot be easily drain under the action of gravity.

② Permanet wilting Point:-

It is defined as the minimum amount of water in the soil that the plant requires not to wilt.

If the soil water content decreases to this or any lower point

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a Plant wilts and no longer recover its turgidity which placed in a saturated atmosphere for 12 hours.

c) Available and readily available moisture Contents:

The difference in moisture content of the soil between Capacity and permanent wilting is termed the available moisture. Available moisture can be expressed as Percentage moisture per as percentage PV or as depth.

d) Optimum of Water

Readily available moisture Contents:

It is a water that a plant can easily extract from the soil Rw

is the soil moisture held between field Capacity and nominated refill point for unrestricted growth. In the range of soil moisture plant need neither waterlogged or water stressed.

E) Optimum Utilization of water:-

The yield increases with water can reaches a certain maximum Value and then fall down. The quantity of water at which the yield is maximum is called the optimum water depth. Therefore the optimum utilization of water means getting maximum yield with any amount of water.

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