ID NO 7786 Section A.
Ahmed Shahzad

Q No 1:
Define Delta and duty and derive this relation ship in Mks and FPS system:-

Delta:-
A crop needs a certain amount of water at fixed interval throughout it's base period is known as delta.

"OR"

The total quantity of water is divided by total irrigated place is known as Delta.

Delta of Crop:- The depth of water in cm or inches required to crop throughout it base period.

Duty of Water:-
It is the relation between the area of crop irrigated and quantity of irrigated water required. during the entire period of the growth of that crop.
It's represent the irrigating capacity.

" Relationship of Delta and Duty in MKS "

Duty = D (hec/cu), Delta = meter base period

volume of water in $1m^3$ Sec in One day = $1 \times 24 \times 60 \times 60$
$= 86400 m^3$ B
$= 8640 m^2 (m)^{-1}$

As 1 hectre = $10000 m^2$
$1 m^2 = 1104 H$
then eq (1) becomes

Volume of water in $1 m^3$ Sec in B days = $86400 B m^3$
$= 86400 B \times 1104$ H-m

Volume of water in $1m^3$ Sec in B days = $8.64 \times B$ H-m, → (ii)

Depth of water required by crop, A = Volume of
Area $A = 8.64 \times B$ H·m D HA = $8.64 \times B$ Dm.

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Relationship of Delta and Duty in FPS".

Duty = D (one cusec of water flowing continously for B days gives a depth of water "A" over an area of "D" acres

Volume of water in $1ft^3$ Sec in one day = $1 \times 24 \times 60 \times 60$
$= 86400 ft^3$

Volume of water in $1ft^3$ Sec in B days $= 1 \times 24 \times 60 \times 60$
$= 86400 B\ ft^3$

As 1 acre = $43560 ft^2$

then eq(1), becomes

Volume of water in $1ft^3$ Sec in B days $= 86400 B ft^2$
$= 84600 B \times 14350$ Acre-ft

Volume of water in $1ft^3$ sec in B day $= 1.983 \times B$ Acre-ft

Depth of water required by crop A = volume

$A = 1.983 B$ Acre-ft D

$A = 1.983 BD$ ft

$A = 1.983\ DB$ ft.

Q1

(b) If wheat requires about 9cm of water after every 35 day and the base period of crop is 140 days. Find out delta for wheat ?

DATA:-

Water requirement of wheat = 9cm
Days interval = 35 days
Base period = 140 days
Delta of wheat, (Δ) = ?

Solution:-

If 35 days = 9cm
then 140 days = Δ

so $\Delta = \frac{9cm \times 140 days}{35 day} = 36cm.$

So the delta for wheat is, **Δ : 36cm**

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Sec A Ahmed Shahzad

Q1 Explain Indus Water treaty?

(c) INDUS WATER TREATY:-

Indus water treaty was signed on Sept 19, 1960 between India and Pakistan and brokered by the World Bank. The treaty fixed and delimited the right and obligations of both countries concerning the use of the water of the Indus River System.

The Indus River Started from tibet in China and flows through kashmir and then drown into Arabian Sea in Pakistan. During the period of British rule in India large Canal system were constructed. After partition the water System was bifuricated, with the headworks in India and canal running through Pakistan.

On April 1, 1948 India Stopped the Supply of water to Pakistan from every Canal flowing to Pakistan. Pakistan Protested and India agreed on interm made in May 4, 1948, Thus agreement was not a proper way so Pakistan aproach World Bank in 1952. And thus finally in Ayub Khan regime an agreement was signed between both countries in Sep 1960, This agreement is known as Indus water treaty.

Q2 Write Significance of Duty of Crop?

(e) Significanse OF DUTY:-

i) It's help in designing an efficient canal irrigation System knowing the total availible water at the head of main canal and the overall duty for all the crops required to be irrigated in different season of the year,

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Explain the factors effecting consumptive use?

The factor that effect consumptive use are

Temperature:-

The rate of consumptive use is effected more by temperature. Low temperature retard plant growth where high temperatures may produce dormancy. Consumptive use may vary widely even in years of equal accumulated temperature because of devition from the normal seasonal distribution.

HUMIDITY:-

Evaporations and transportion are accelerated on days of low humidity and slowed during periods of high humidity On low humid day great use of water by vegetation may be expected.

WIND VELOCITY:-

Evaporation of water from land and plant surfaces takes place more rapidly when there is moving air than under calm air Hot, dry winds and other unusal condition during the growing period will affect the amount of water.

Soil Topography:-

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

SUNLIGHT:-

The sun is the source of all energy used in crop growth and evaparation of water. This longer day may allow plant transpiration to continue for long period each day

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Q2 b) Wheat is to be grown.... ?

Data:-

Cummulative consumptive use, (Cu) = 40cm

Usefull rainfall, (cm) = 10

Water application Efficiency, $\eta a = 80\% = 0.8$

Required:-

Field irrigation requirement (FIR) = ?

Consumptive irrigation requirement (CIR), = ?

Solution:-

We know that,

Consumptive Irrigation Requirement, CIR = Cu - Re

CIR = 40 - 10

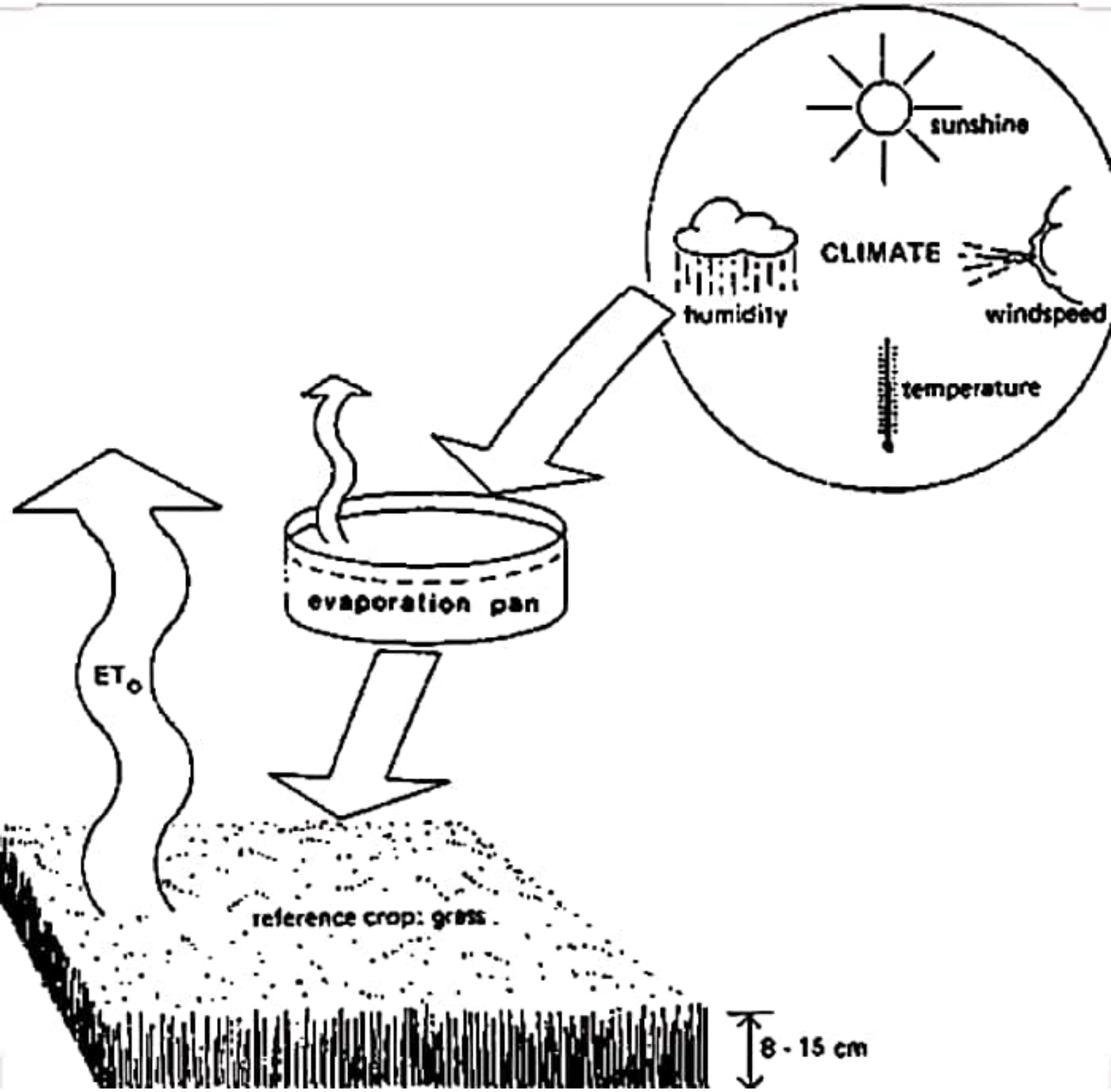
CIR = 30cm

Field Irrigation Requirement, $FIR = \frac{CIR}{\eta a}$

$FIR = \frac{30}{0.8}$

FIR = 37.5cm

Q2) c) Explain Class A Pan Evaporation measurement?



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Q No 2

b) Explain Crop Season:-?

Rabi Crop Season:-

Rabi Crop are agriculture cop that are grown in winter and harvested within the spring in Asia. The rabi crop are sown in November and harvested in April/May These are also known as Monsoon Crops. These crops depend on the rainfall pattern. These crops include Wheat barely, mustard and green peas etc.

kharif Crop:-

kharif crops are plants like rice that are cultivated and harvested in India, Bangladesh, Pakistan. These crops sown in June and harvested in November depending on the area. Rice, maize and cotton are the main kharif crops in Pakistan

kharif Rabi Ratio:-

The area to be irrigated for rabi crop is usually quite that for the kharif crop. This ratio of proposed area to be irrigated in kharif season there to within the rabi season is named kharif Rabi Ratio. This ratio is generally 1:2 i-e kharif area is one half of the rabi ratio.

Q3

a) **Field Capacity:-**

In many soils after rain or irrigation, the soil immediatly start draining to the deeper depth. After one or two days the wat content in soil reach with the time. For many soil, a nearly constant value for a particular depth in question this some what ability of value of water content expressed as percent is called field capacity.

Permanent Wilting Point:

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In many Soils. Permanent wilting point is defined as the minimum amount of water in soil that the plant requires not to wilt. If the soil water content decrease to this or any lower point a plant wilts and can no longer recover its turgidity when placed in graduated atmosphere to 12 hours

Available Moisture Content:-

The difference in soil moisture content of soil between field capacity and Permanent wilting is termed the available moisture Available moisture can be expressed as percentage moisture.

Optimum Utilization of Water:-

If a crop is sown and produce under identical condition, using different amount of water depth, the yield is found to vary. The yield increase with water, reach a certain maximum value and then falls down. The quantity of water at which the yield is maximum is optimum water depth. Therefore optimum utilization of irrigation generally means getting maximum yield with any amount of water.