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ID NO = 7823

Section = A

Paper = Irrigation Engineering.

Question NO = 03

A) Field capacity:-

The term volume unit is interchangeably used with the terms Water holding capacity and Water Retention capacity.
Field capacity is that amount of soil Moisture OR Water content held in soil after excess Water has drained away and therefore the Rate of downward Movement has Materially decreased. Which usually takes Place within 2-3 days. After a Rain OR IRregation is applied to the soil of uniform structure and texture.
When irrigation is applied to the soil all the soil pores get cramed with Water. After the gravitational drainaged. the Massive soil Pores are cramed with both air and Water.

B) PERMANENT WILTING POINT:-

As Moisture is lost from the soil, the Puopose at which the face force with which the remaining Moisture adheres to soil

Particles exceeds that exerted by plants Roots. Plants are unable to absorbs moisture or Wilting Results. The Permanent Wilting Point usually occure When soil moisture is held with a force of about 15MPa (is bad) It is also Measured because Percentage of Soil Remaining with the soil after specified test Plants has melted under defined condition

(c) OPTIMUM UTILIZATION OF WATER:-

If a crop is sown and Produced under absolutely identical condition using different amount of water depths. The yield is found to vary. The yield increase with Water reaches a certain Maximum value and then falls down. The quantity of Water at which the yield is maximum is named the optimum Water depth. optimum utilization of irrigation generally means getting maximum yield at any Point of Water.

ⓐ Available Moisture (Available Water):-

The difference in Moisture content of the Soil between volume unit and permanent Wilting is termed the Available Moisture. Available Moisture are opten expressed as Percentage moisture. or as depth.

⇒ Readily Available Moisture:-

Soil Moisture content Near the Wilting Point isn't Readily available to the plant. The term Readily available Moisture has been Wont to ask that portion of the available moisture that's most easily extracted by plants, approximately 75% of the available Moisture.

Question No = 01 (Part = c)

INDUS WATER TREATY:-

Sign within the year 1960 by former P.M Nehru and therefore then the President of pakistan Ayub Khan. The (IWT) is an agreement that was made to sketch the control over the 6 Rivers that meet India then pakistan into the indus basin.

The origin of the six Rivers that make the indus basin happen in the tibet from where they flow across the Himaliyan Ranges and end with the arabian Sea South of Karachi. The treaty was devised because the indus basin was one among the network b/w the two nations and since pakistan was unsurprisingly threatned with prospect are being fed by india.

Question No = 01 (Part = D)

Significance OF DUTY OF A CROP:-

⇒ It helps in designing efficient canal irrigation system. Knowing the entire available water at the top of most canal and therefore the overall duty for all the crops required to be irrigated in several season of the year. The worst which may irrigated are often figured out.

⇒ Inversly if we all know the crop area required to be irrigated and their duties we will compute the discharge required for designing the canal.

Question NO = 01 (Part = B)

Given Data:-

Water Requirement = 9cm
Days interval = 35 days
Base period = 140 days
Delta of Wheat = (Δ) = ?

Solution:-

35 days = 9 cm

140 days = Δ

So We Know that

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

$$\Delta = \frac{1260\ cm}{35}$$

$$\boxed{\Delta = 36\ cm}$$

Question No = 01 (Part = a)

DUTY:-

Duty is the area of land that can be irrigated with a unit volume of water supplied accross the base period. It is calculated in Hectare.

DELTA:-

DELTA is the depth of water required to raise a crop over a unit area. Delta is calculated in centimeter OR Mtre.

RELATION B/W DUTY AND DELTY IN MKS AND FPS SYSTEM:-

Let Duty = D (Hectare/cumec)

Delta = A Meter base period = B days by definitio

Volume of Water. $1m^3$ sec in one day =

$\Rightarrow 1 \times 24 \times 60 \times 60 = 86400 m^3 = 86400 m^2 \cdot m \rightarrow (i)$

As 1 Hectare = $10000 m^2$ $\Rightarrow$ $1m^2 = 1/10000$ H

Then Eq (i) becomes

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

$\Rightarrow 86400 B \times 1/10000$ H-m Volume of Water $1m^3$ sec in 'B' days = $8.64 \times B \cdot H \cdot m \Rightarrow$ (ii)

Depth of Water Required by coop A $\Rightarrow$

Volume Area A = $8.64 \times B$ (H-m) HA = $8.64 \times B$ (m)

In FPS SYSTEM:-

Duty = D (Acre/cusec)

Delta = B By definition

Volume of Water $1 ft^3$ Sec in one day $\Rightarrow$

$\Rightarrow 1 \times 24 \times 60 \times 60 = 86400 ft^3$.

Volume of Water $1 ft^3$ Sec in B days

$\Rightarrow 1 \times 24 \times 60 \times 60 = 86400 B ft^3 = 86400 ft^2 \cdot ft \rightarrow (i)$

Volum of Water $1 ft^3$ sec in B day = $86400 ft^3$

$= 86400 B \times 1/43560$ Acre ft Volume of Water $1 ft^3$ sec in B day = $1.983 \times B$ Acre ft $\rightarrow$ (ii)

Depth of Water by coop = Volume Area = 1.983

= Volume Area A = 1.983 B Acre-ft D Acre A=
⇒ 1.983 x B D ft-

Question NO=2 (part=D):

RABI CROP SEASON:-

Rabi crop or Rabi harvest are agriculture crop that are sown in winter and harvested within the spring in india and Pakistan. The word spring from the Arabic word which is employed within the Indian Subcontinent where it's the spring harvest also referred to as the winter crop.

Khariff crops:-

Khariff crops monsoon crops or autumn crops are domesticated plants like Rice that are cultivated and harvested in india and Bangladesh.

Monsoon Rain may begin as eary as May in some parts of the indian Subcontinent and crops are generally harvested from 3rd week of sep to oct

again depending upon the Region and therefore the crops.
Rice, Maize, Sorghum and cotton are the main Kharif crops.

Kharif Rabi Ratio:-

The area to be irrigated for Rabi crops is usually Quite that for the Kharif crop. The Ratio of Proposed area to be irrigated in Kharif season with the Rabi Season is named, Kharif Rabi Ratio. This Ratio is generally 1.2 i.e Kharif area is onehalf of the Rabi area.

Question NO=2 (Part=b)

Given Data:-

useful Rainfall = 10
Water application Efficiency (ηa) = 80% = 0.8
Commulative consumptive use = (CU) = 40cm

Required:-

Field Irrigation Requirement (FIR) = ?

Consumptive Irrigation Requirement (CIR) = ?

Solution:-

We can solve it by formula

"Compu" Consumptive Irrigation Requirement

$$CIR = CU - Re = 40 - 10 = 30 \text{ cm}$$

$$\boxed{CIR = 30 \text{ cm}}$$

Field Irrigation Requirement:

$$FIR = \frac{CIR}{\eta a} = 30/0.8 = 37.5 \text{ cm}$$

$$\boxed{FIR = 37.5 \text{ cm}}$$

Question No = 2 (Part = a)

Factor AFFECTING CONSUMPTIVE USE:-

Following are the factor Affecting of the Consumptive use.

1) PRECEPTION:-

The amount and Rate of Precipitation may have some minor effect on the amount of water Consumptively used during any summer Part of the precipitation from nedvy storm may be lost by surface Runoff. other storm may be of such intensity and amount that a large Percentage of the moisture will enter the soil and become available for plant transpiration.

2) TEMPERATURE:-

The Rate of consumptive use of water by crops in any particular locality is probably affected more by temperature which are long for time period is a good measure of solar Radiation. then by any other factor.

3) **HUMIDITY:-**

Evaporation and transpiration are affected by days on low humidity and slowed during periods of high humidity. During periods of low humidity, greater Rate of use of water by vegetation may be expected.

4) **Wind movement:-**

Evaporation of from waters from land and Plant surface take place more Rapidly where there is moving air than under calm air condition.

5) **GROWING SEASON:-**

The growing season which is tied Rather closely to temperature has a major effect on the seasonal use of waters by plants.

6) **LATITUDE AND SUNLIGHT:-**

Although latitude may hardly be called a climatic factor, it does have considerable influence on the Rate.

of consumptive use of water by various plants.

7) **AVAILABLE IRRIGATION WATER SUPPLY:**

All the above mentioned climatic factor influence the amount of water can be consumed in a given area. There are other factor that also cause important difference in the consumptive use Rates.

8) **SOIL FERTILITY:**

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

Question NO# 2 (Part=C)

CLASS A PAN EVAPORATION:

The class A pan Evaporation pan may be standard device

for a Manual measurement of Evaporation (Australian Bureau of Meteology class A type.) The pan Represents an open body of water. It's coammed with water and exposed on a Plate plateau. The evaporation Rate is calculated by change in level by free water surface and therefore the Recorded Rainfall in (millimeters). Data are often calculated for any period Requised for estimation of Evaporation Rates.