



CIVIL ENGINEERING

Irrigation

Hand Notes For GATE, IES & PSUs

Hand Notes

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Note : We also providing GATE & IES Materials [Handnotes, Shortnotes & Books], All Reports [Seminar Reports & PPT]

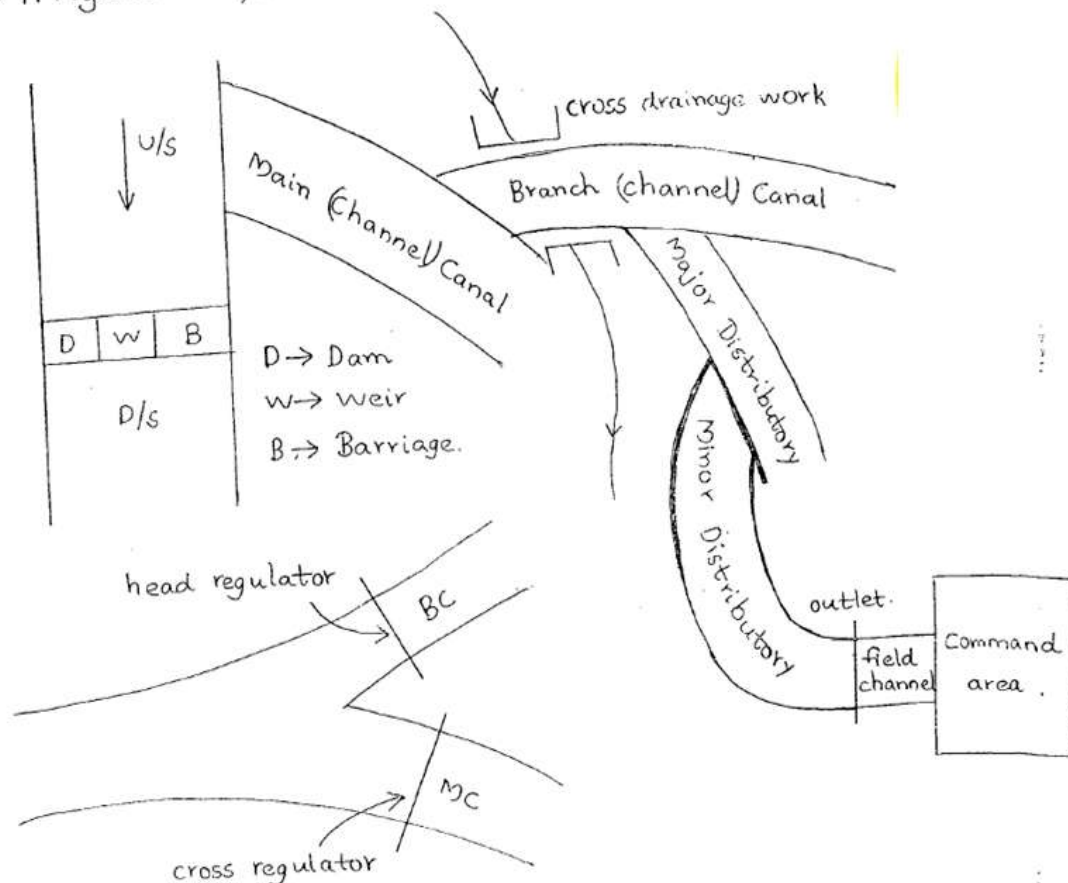
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IRRIGATION

Science which deals with artificial supply of water to the crops.

→ Irrigation System:



A regulator controls the flow of water into the canal (weir-like structure)

Irrigation system comprises of hydraulic structures like dam, weir, barrage, canal system, cross drainage works (like aqueduct), regulators, canal falls and canal escapes (Surplus escape & Silt escape)

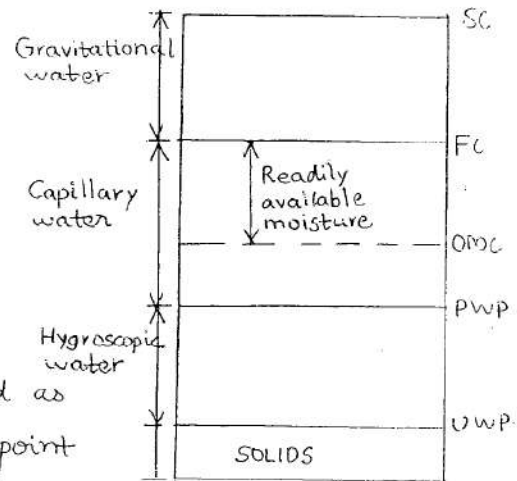
* Hygroscopic water

Thin layer of water surrounding the soil grains which the roots of plants cannot absorb.

→ Types of water

1. Gravitational water
2. Capillary water (available water)
3. Hygroscopic water

The moisture content expressed as percentage at ultimate wilting point is called 'Hygroscopic Coefficient'



* Hygroscopic Water

It consists of two parts:

- (i) Amount of moisture absorbed from atmosphere by the soil grains.
- (ii) Thin film of moisture sticking to the soil grain which cannot be extracted by the plant.

* Capillary water.

The amount of moisture stored in capillary pores which can be extracted by the plant is called capillary water or available water.

Saturation Capacity :- a state where all the voids are filled with moisture.

Field capacity :- amount of moisture retained in the soil against pull of gravity.

Water stored in capillary pore against gravity pull (3) in the root zone - field capacity

Water stored in the pore spaces of soil grains - saturation capacity

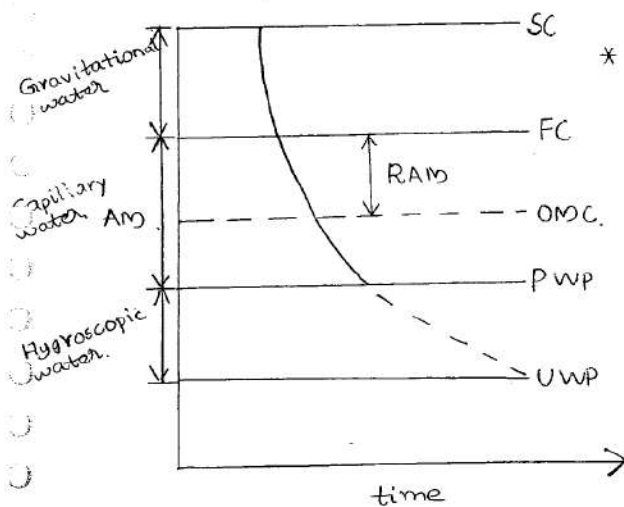
$ET = \text{Evaporation} + \text{Transpiration}$

$CU = \text{Consumptive Use} = E + T + \Delta W$
 $\Delta W \rightarrow \text{for metabolic activity}$

* Temporary Wilting Point - Plants can make use of water available in the soil.

* Permanent Wilting Point - Plant recovers only with application of water.

* Ultimate Wilting Point - even with application of water, plant cannot recover. i.e., plant is dead.



* Available moisture (y):

$$AM, y = FC - PWP.$$

* Readily available moisture = 75-80% AM.

NOTE:

- ① Yield is less if irrigation is carried out below OMC
- ② Yield is more if irrigation is carried out above OMC
- ③ Duty of irrigation engineer is to supply water when moisture content reaches OMC

* Gravitational water (or) Unavailable water
 $= SC - FC$

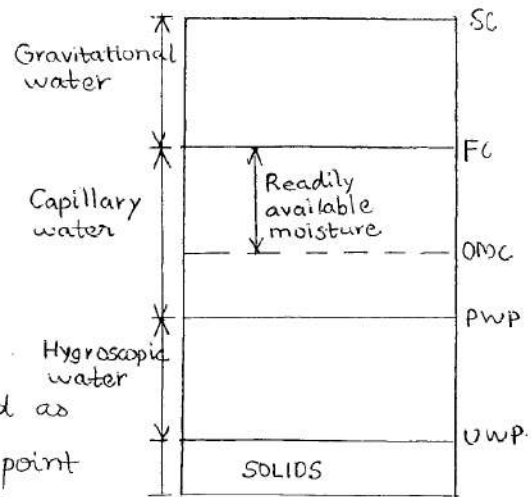
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