



## CIVIL ENGINEERING

# Irrigation

*Hand Notes For GATE, IES & PSUs*

## Hand Notes

**Page Length : 77**

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

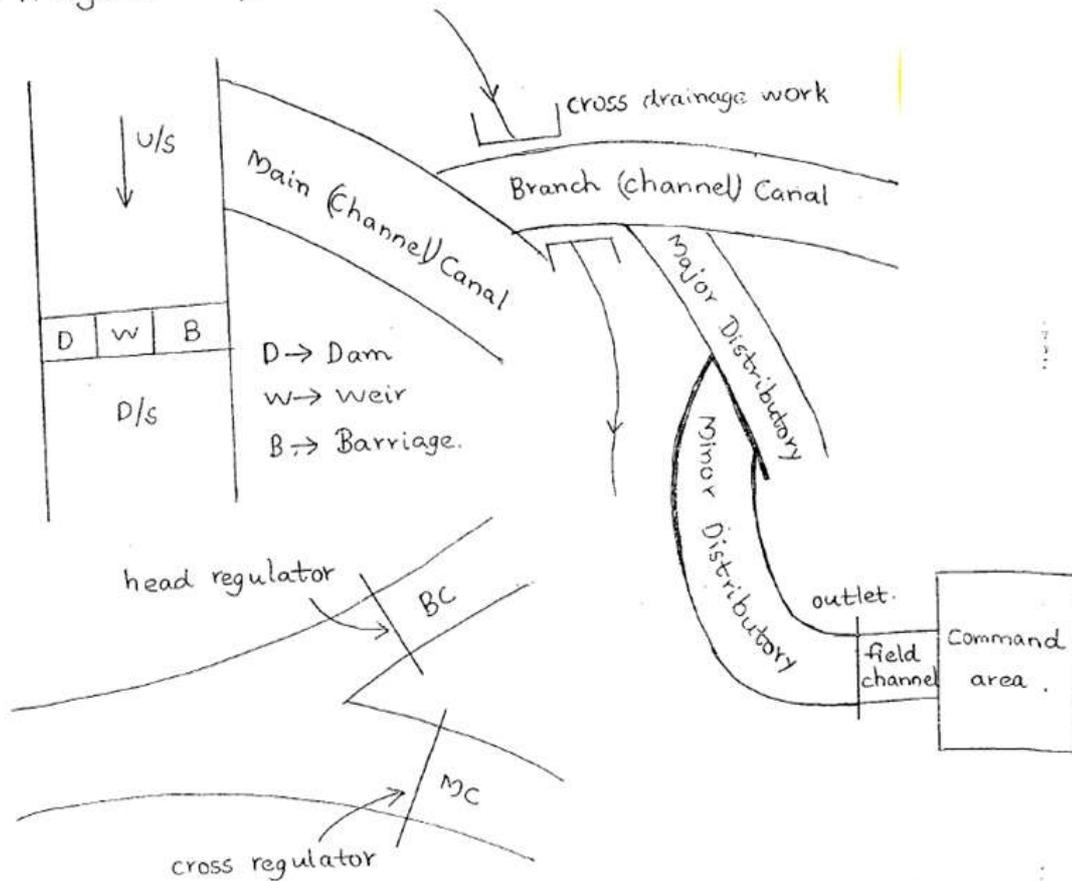
**Goto :** [www.martcost.com](http://www.martcost.com)

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DAY

# 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)

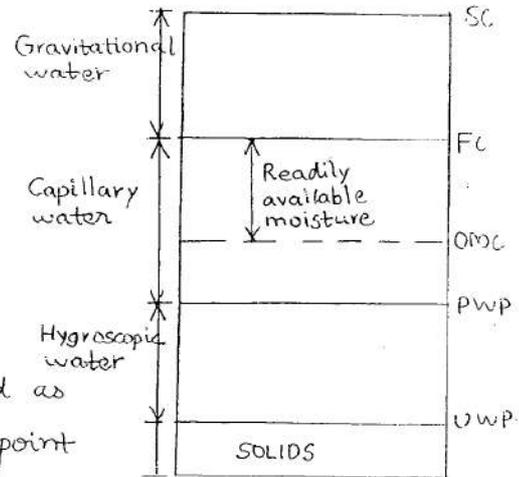
### \* Hygroscopic water

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 in the root zone - field capacity

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

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

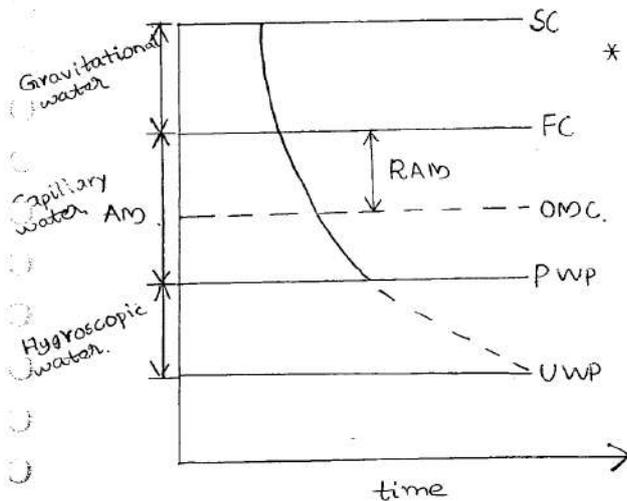
$$CU = \text{Consumptive Use} = E + T + \Delta W$$

↳ 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:**

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

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

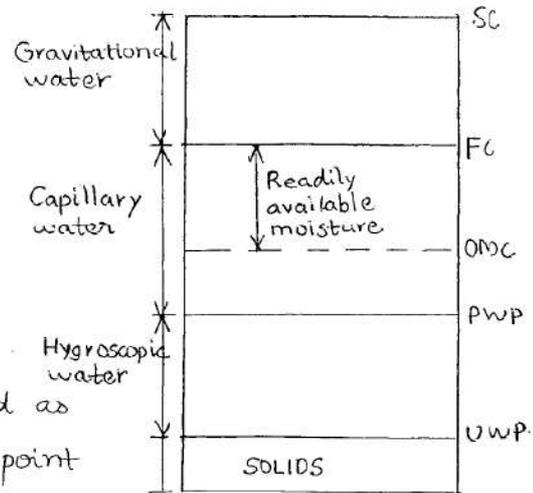
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