

**SSC JE | JSSCJE | NHPC -JE 2023**



# **Fluid mechanics**

*Civil Engineering*

**ONE SHOT REVISION OF**

**FLUID CLASSIFICATION IN 10 MINUTES**

*Sure Shot 2 Marks*



**ATAL Batch**  
5 in 1

**CIVIL ENGINEERING**

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Online Live Classes By  
Adda247



Start June 30, 2023      8 AM to 10 PM

Double Validity

BILINGUAL

**Civil  
Engineering**

**ka Mahapack**

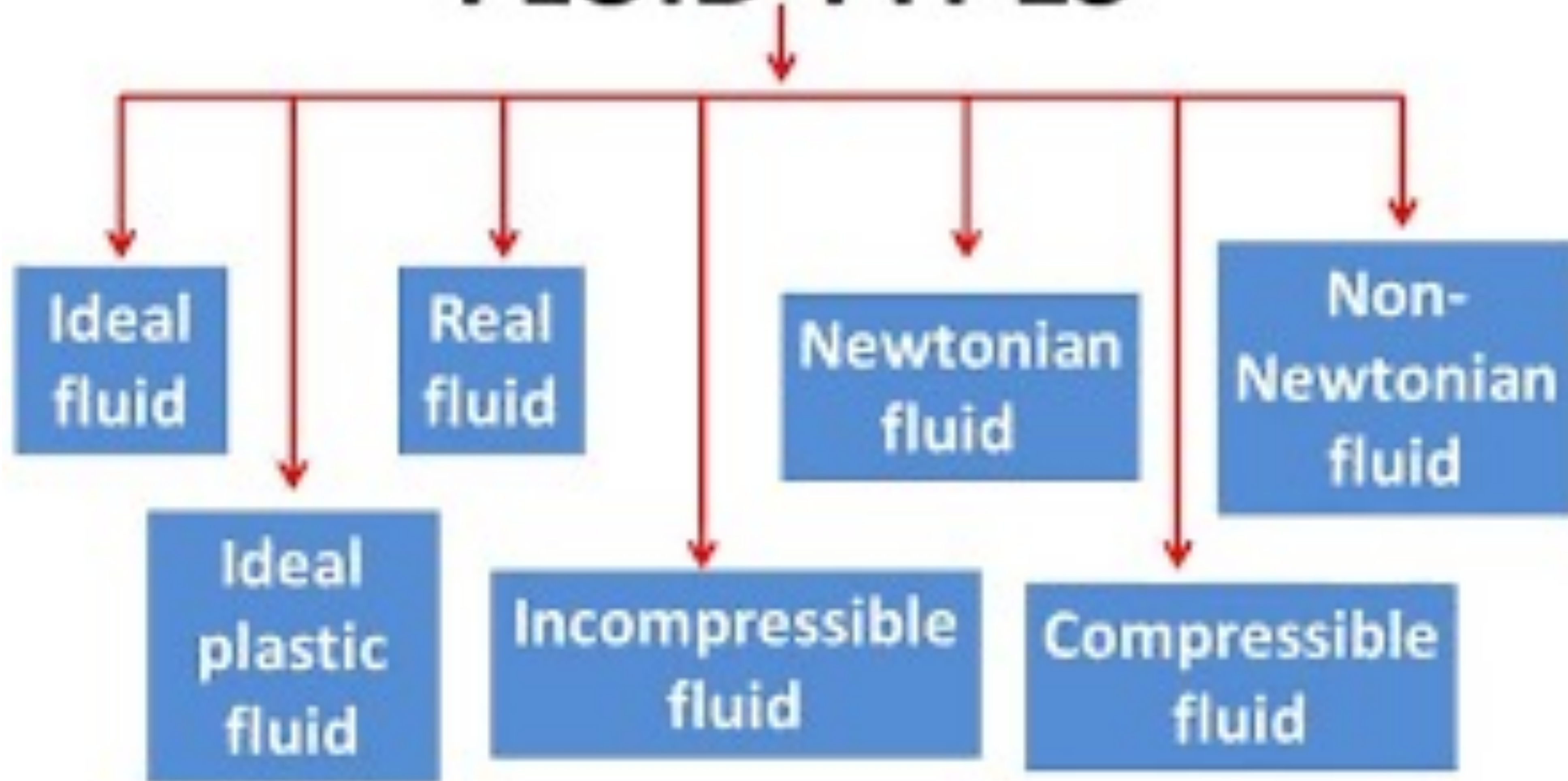
Live Class, Video Course  
Test Series, Ebooks

**CIVIL Engineering  
MAHA PACK**

**Max disc.code - Y201**

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# FLUID TYPES

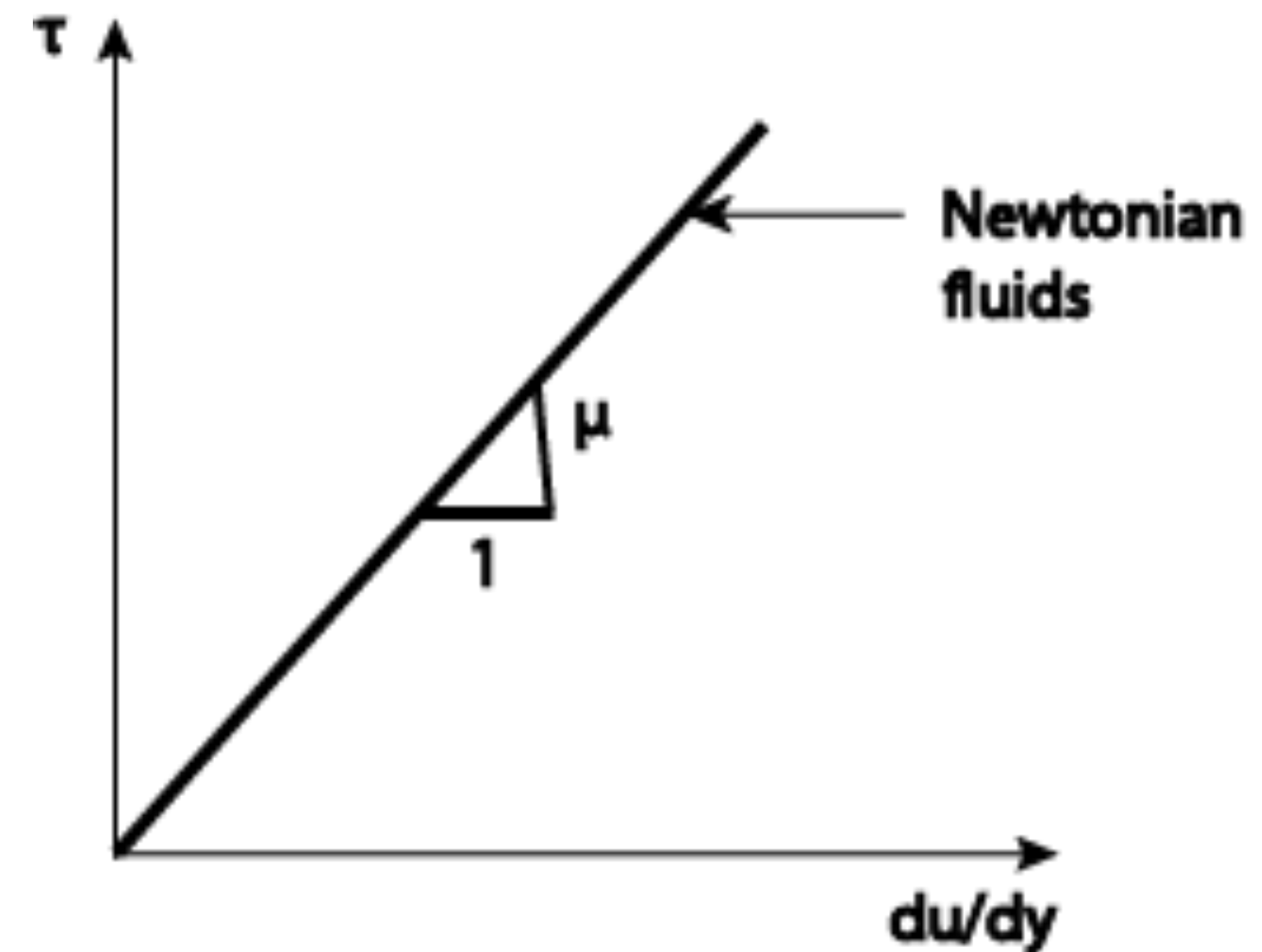


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| Ideal fluid                           | Real fluid             |
|---------------------------------------|------------------------|
| Ideal fluids have zero viscosity.     | Viscosity exists.      |
| Incompressible.                       | Can be compressible.   |
| Infinite bulk modulus                 | Finite bulk modulus    |
| No surface tension                    | Surface tension exists |
| Imaginary and do not exists in nature | Exists in nature       |

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- **Newtonian fluids defined as fluids for which the shear stress is linearly proportional to the shear strain rate**
- Newtonian fluids are analogous to elastic solids (Hooke's law: stress proportional to strain)
- Any common fluids, such as air and other **gases, water, kerosene, gasoline, and other oil-based liquids, are Newtonian fluids**
- $\tau = \mu \frac{du}{dy}$  where  $\mu$  is the shear viscosity of the fluid



## Max disc.code - Y201

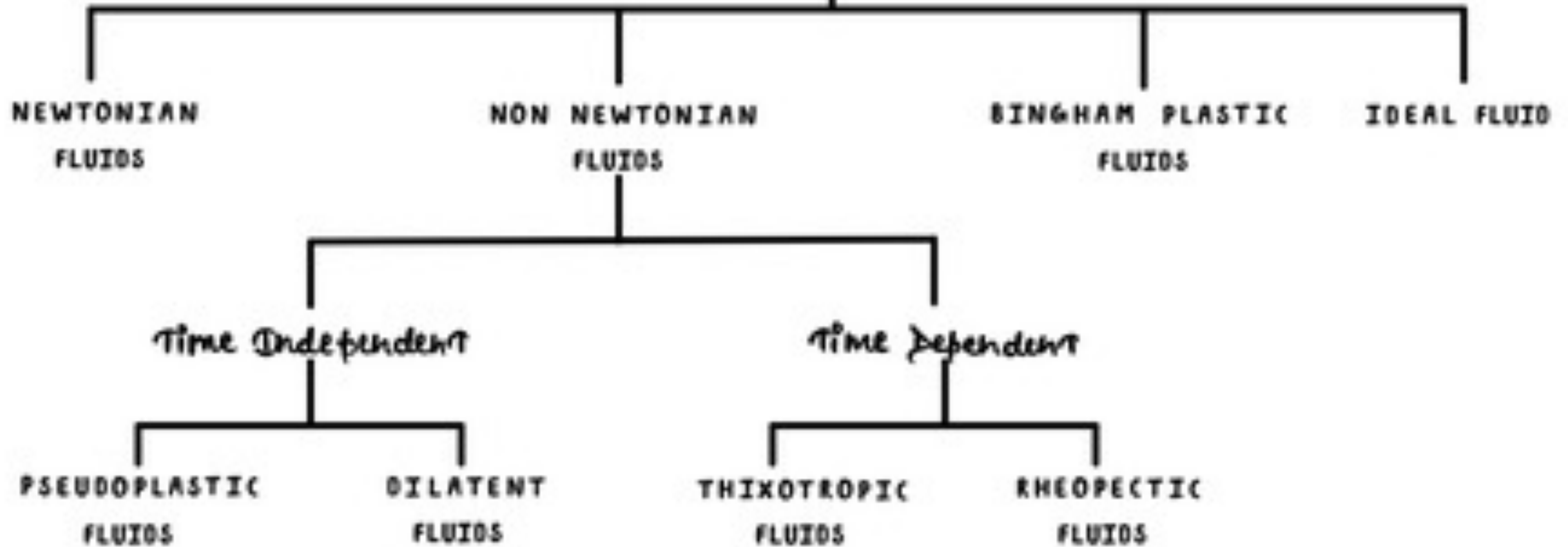
### Non-Newtonian fluid:

- Fluids for which shear stress ( $\tau$ ) is not directly proportional to the deformation rate or velocity gradient are non-Newtonian fluid.

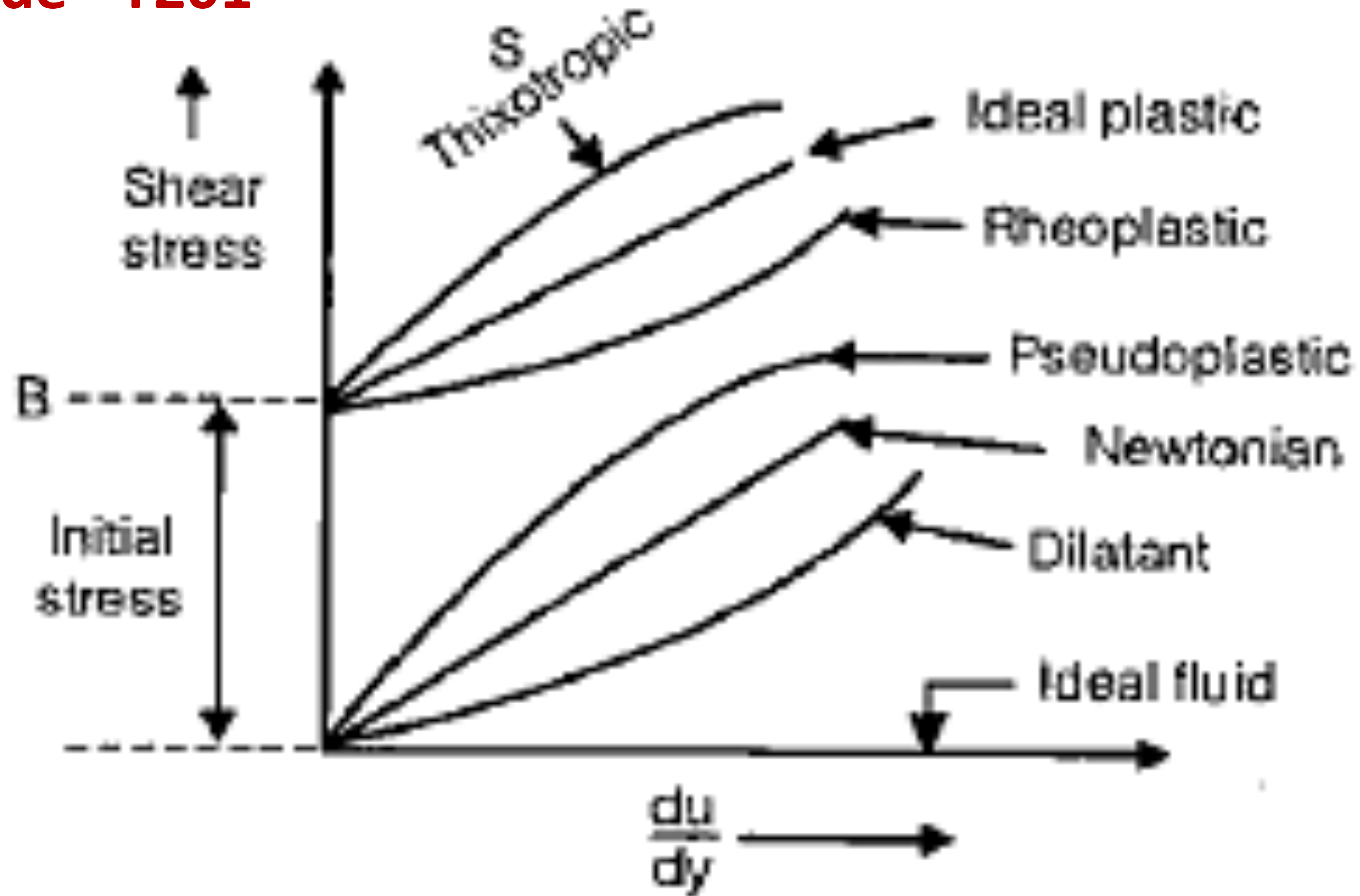
# RHEOLOGY



# CLASSIFICATION OF FLUIDS



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### Pseudoplastic:

- Fine particle suspension, gelatine, **clay, blood, milk**, paper pulp, polymeric solutions such as rubbers, paints.



### Dilatant fluids:

- Ultrafine irregular particle suspension, sugar in water, aqueous suspension of rice starch, quicksand, butter printing ink.



### Ideal plastics or Bingham plastic fluids:

- Sewage sludge, drilling muds, toothpaste.



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### **Thixotropic:**

- Printer's ink, crude oil, lipstick, certain paints and enamels



### **Rheopectic fluids:**

- Very rare liquid-solid suspensions, gypsum suspension in water and bentonite solutions.

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