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Experiment No-1

Determination of support Reactions of simple and compound Beams

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* Questions -

Q1) what is meant by the equilibrium of a force system? what are the physical and analytical conditions of equilibrium?

Ans → Equilibrium is defined as the condition of a body, which is subjected to a force system whose resultant force is equal to zero. It means the effect of the given force system is zero and the particle or rigid body is said to be in equilibrium.

Physical and analytical conditions of equilibrium are -

i) Sum of all external forces on the system is zero.

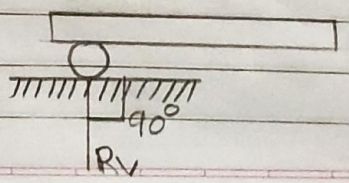
ii) Sum of all torque on the system is zero.

Q 2) what are the different types of supports and their corresponding reactions?

Ans → The different types of supports and their corresponding reactions are -

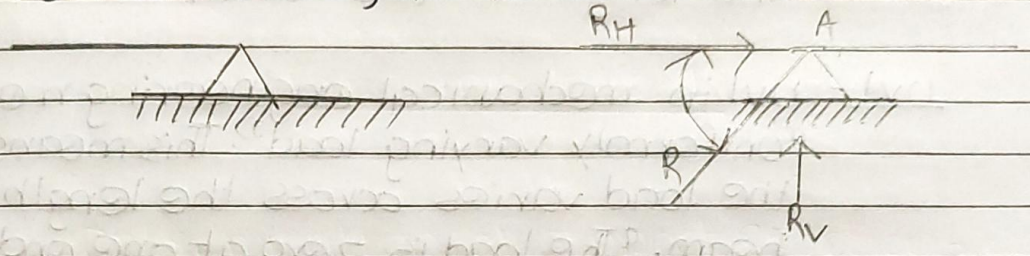
① Roller support :-

Beams end is supported on rollers. Reaction is at right angle. Roller can be treated as frictionless.



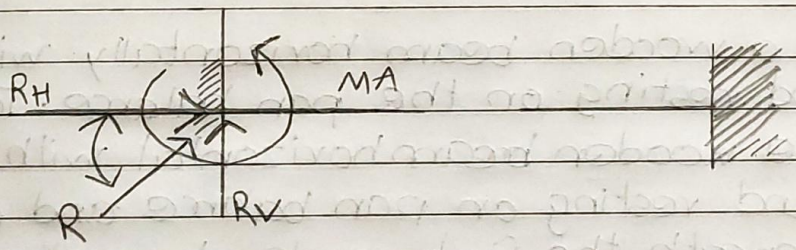
② Hinged Support:-

At a hinged end, a beam cannot move in any direction support will not develop any resisting moment, but it can develop reaction in any direction. In hinged support, there are two reaction is acting, one is vertical and another is horizontal. i.e., RH and RV



③ Fixed Support:

At such support the beam end is not free to translate or rotate at fixed end there are three reaction a horizontal reaction (R_H), a vertical reaction (R_V), and momentum(M)



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Q3) what do you mean by udl & uvl?

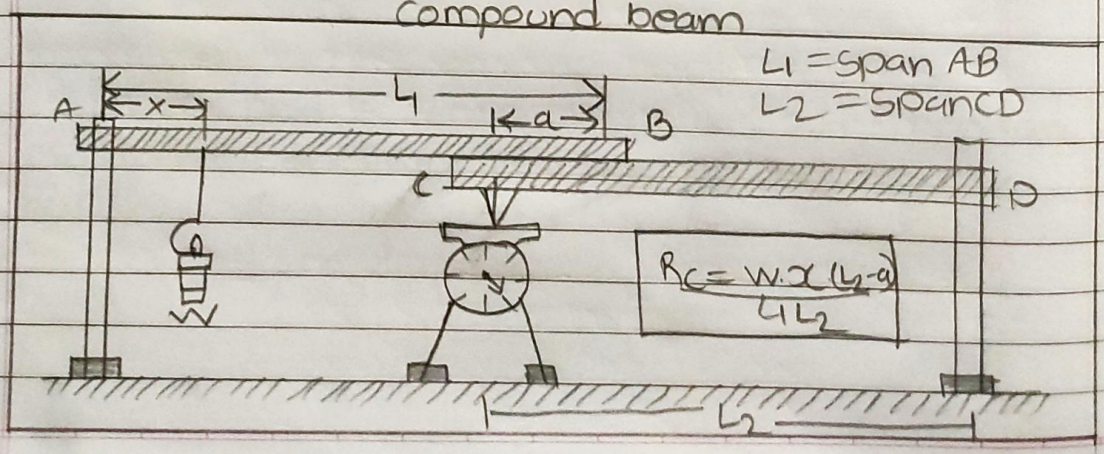
Ans→ udl - udl in engineering, means "uniformly distributed load", this is where a load is evenly spread over a beam, meaning the rate of loading is uniform across the length of the beam.

uvl - uvl in mechanical engineering means "uniformly varying load". This means that the load varies across the length of the beam. "The load is zero at one end and increases uniformly to the other end". This type of load is called a triangular load

Q4) what is a compound beam? Illustrate by an example.

Ans→ Place a wooden beam horizontally with its one end resting on the pan balance. Take anothe wooden beam horizontal with its one end resting on pan balance and othe end beneath the first wooden beam's end. This is called compound beam.

Compound beam



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Q5) What is meant by F.B.D of a body?

Ans → F.B.D means 'Free Body Diagram' is a diagrammatic representation of the isolated system treated as a single body. It shows all forces applied to the system by mechanical contact with other bodies, which are imagined to be removed.