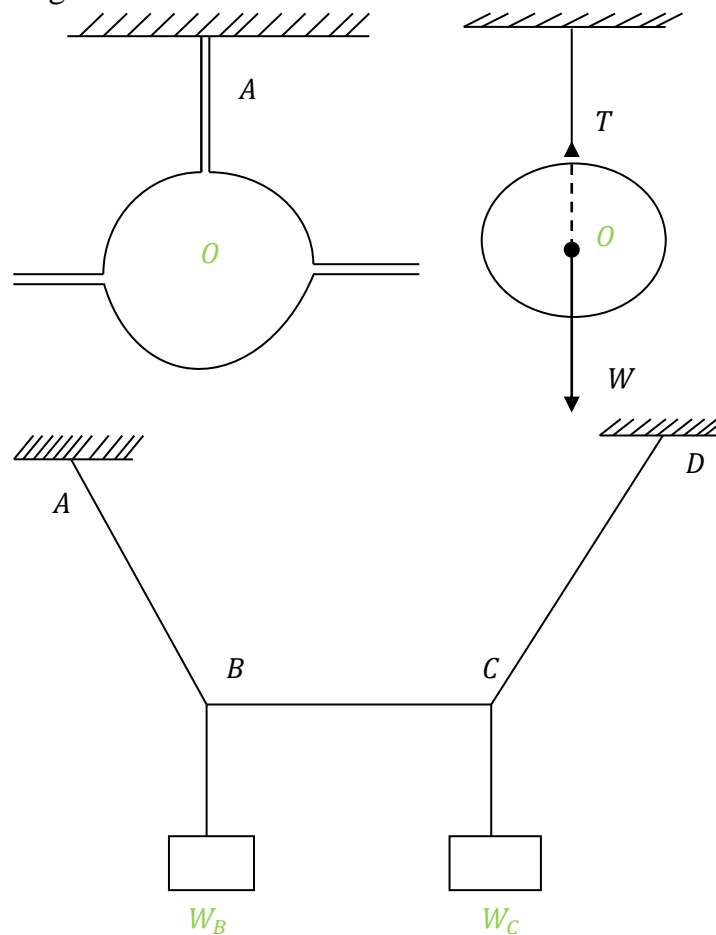


Free body diagram:

- In equilibrium analysis of structures / machines, it is necessary to consider all the forces acting on the body and exclude all the forces which are not directly applied on it.
- The problem becomes much simple if each body is considered in isolation i.e, separate from **surronding** body or bodies.
- Such a body which has been separated or isolated from the **surronding** bodies is called free body.
- The sketch of showing all forces and moments acting on the body is called as the free body diagram.



Freebody diagram at B:

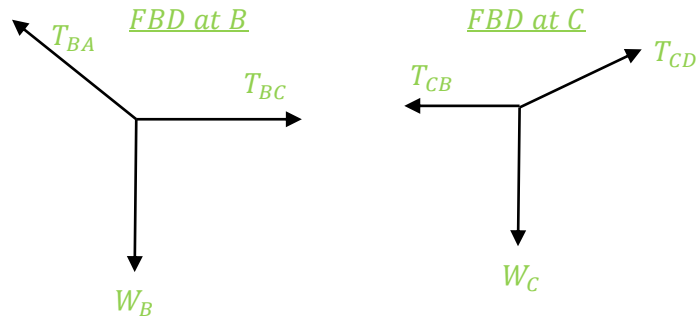
The forces acting at B are

- i. Weight of the body attached at B, acting downwards, let it be W_B
- ii. Tension on string AB, acting at B towards A, let it be T_{BA}

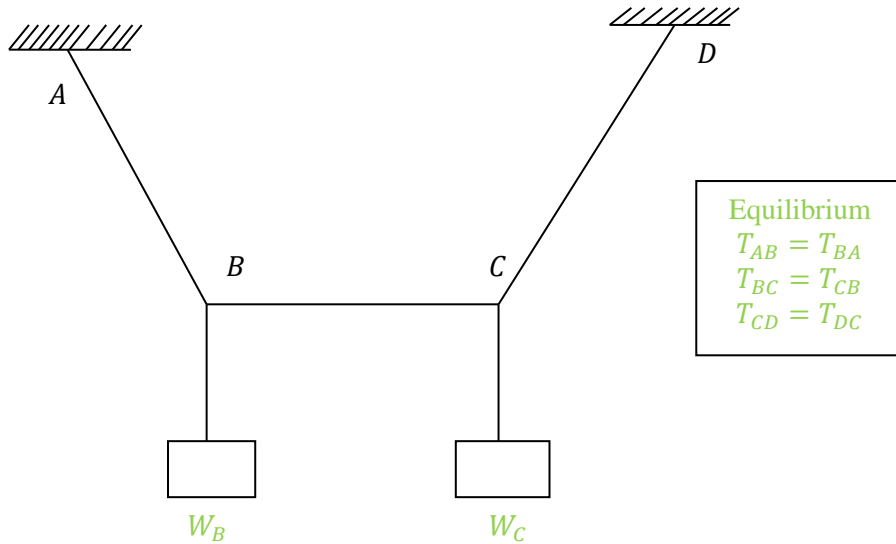
- iii. Tension on string BC, acting at B towards C, let it be T_{BC}

Freebody diagram at C:

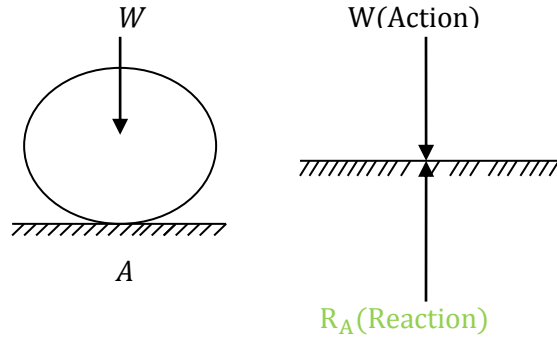
- i. Weight of the body attached at C, acting downwards, let it be W_C
- ii. Tension on string CB, acting at C and towards B, let it be T_{CB}
- iii. Tension on string CD, acting at C and towards D, let it be T_{CD}



Now all the forces acting on the string ABCD.



Action and Reaction:

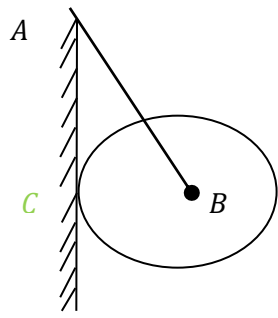


Consider a ball is place on a horizontal surface. The self-weight of the ball (w) is acting vertically downwards, through its centre of gravity. This force is called as “Action”.

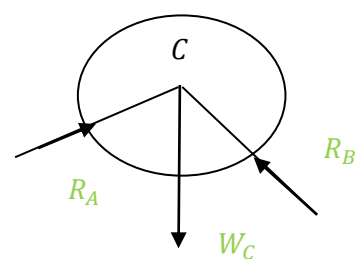
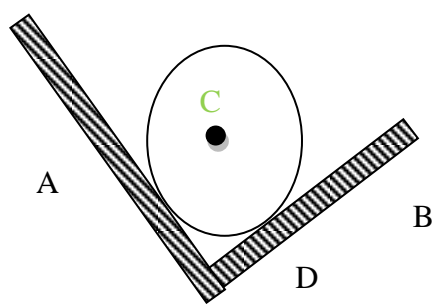
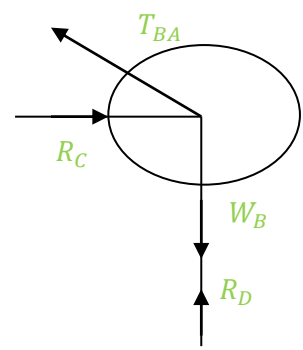
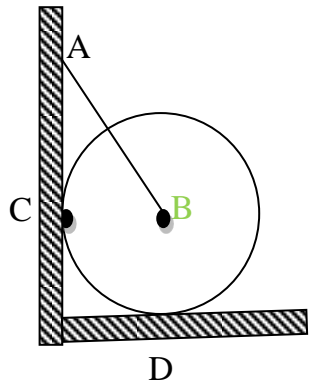
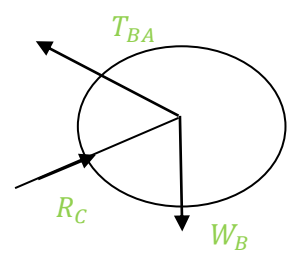
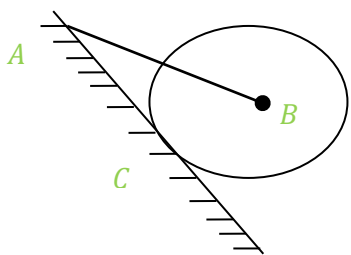
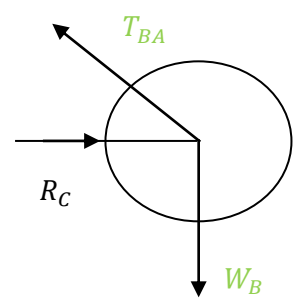
Now, the ball can move horizontally. But its vertical downward **motion** is resisted due to resisting force developed at support, acting vertically upwards. This force is called Reaction.

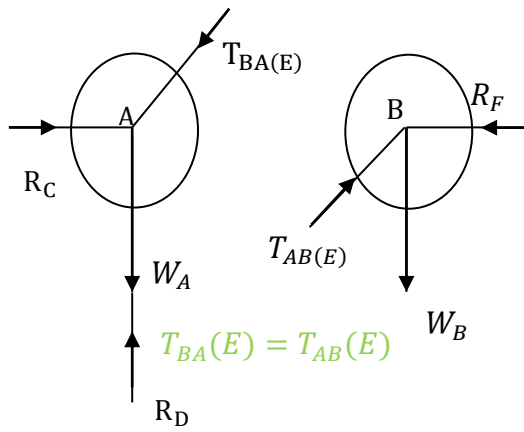
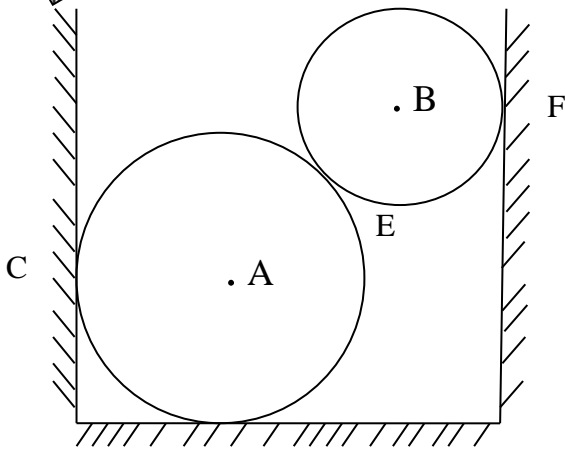
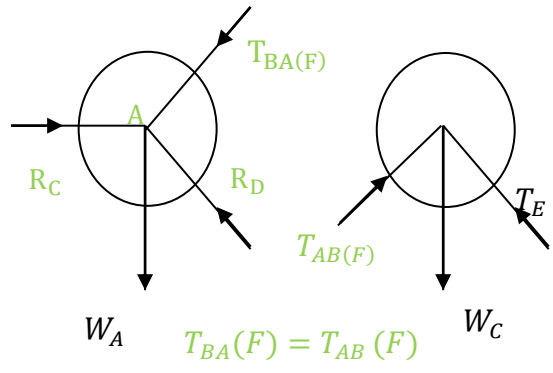
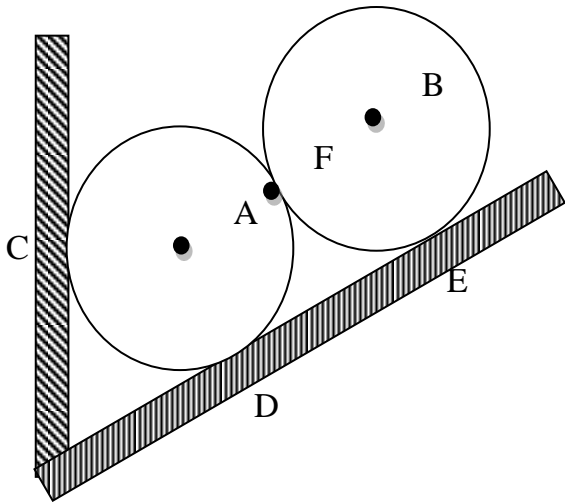
Free Body Diagram

Bodies under Equilibrium



Free Body Diagram





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