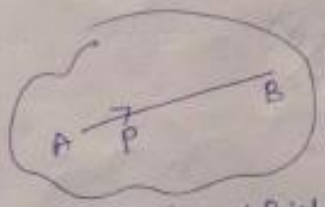
Principle of Transmissibility

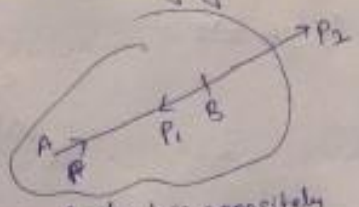
6. Principle of transmissibility :-

When the point of application of a force acting on a body is shifted to any other point on the line of action of the force without changing its direction, there occurs no change in the equilibrium state of the body.

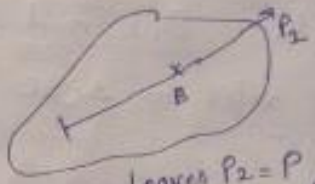
This implies that a force acting at any point on a body may also be considered to any other point along its line of action without changing its effect on the body.



Force P acting at Point A
B is another point on the line of action of P



Apply two oppositely directed forces (P_1 and P_2) equal to and collinear with P.
P & P_1 cancel each other.



Leaves $P_2 = P$
This implies that a force acting at any point on a body may also be considered to act at any other point along its line of action.

Fig. 1.17.

§1.7 PRINCIPLE OF TRANSMISSIBILITY

This principle states as follows :

The condition of equilibrium or motion of a rigid body will not be changed if a force acting on the body at a certain point is replaced by a force of the same magnitude and same direction but applied at a different point, provided the two forces act along the same straight line.

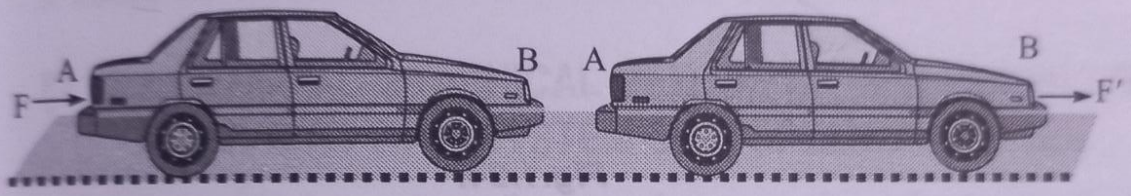


Fig. 1.18.

The force F at A on the car shown in Fig. 1.18 can be replaced by an equal force F' at B without disturbing the state of motion of the car if $F' = F$.