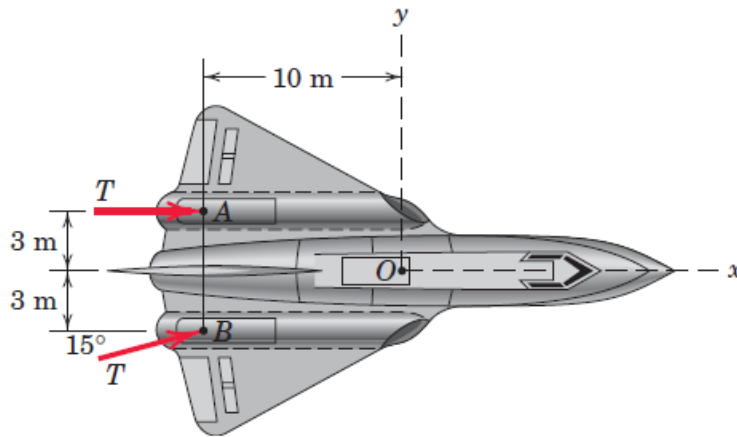


Homework – 1

Problem 1: The directions of the two thrust vectors of an experimental aircraft can be independently changed from the conventional forward direction within limits. For the thrust configuration shown, determine the equivalent force–couple system at point O . Then replace this force–couple system by a single force and specify the point on the x -axis through which the line of action of this resultant passes. These results are vital to assessing design performance. Repeat your calculations for an angle 10° that the thrust at B makes with the x -axis.



Problem 2: A force F is applied to the surface of the sphere as shown. The angles ϕ and θ locate point P , and point M is the midpoint of ON . Express F in vector form,

- (a) using the given x -, y -, and z -coordinates,
- (b) using spherical coordinates.

