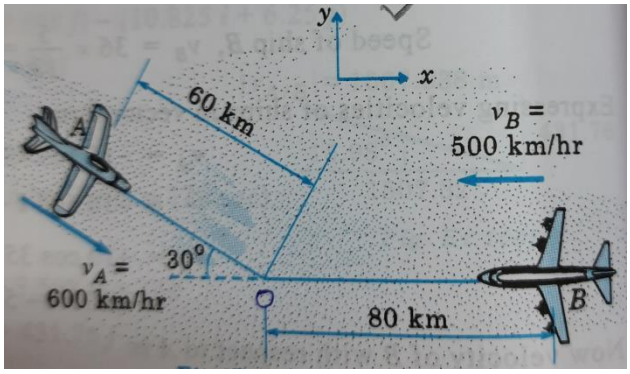
Class work problems on module 2.1 (Relative motion) – 2022

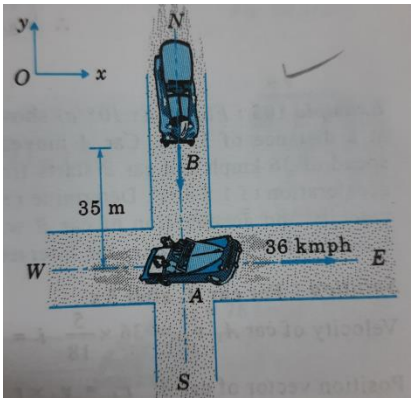
1. Two trains A and B are moving on a parallel track in opposite direction. Velocity of A is twice that of B. They take 18 sec. to pass each other. Determine their velocities given length of train A is 240 m and length of B is 300 m.

2. Two trains leave a station in different directions at the same instant. Train A travels at 36 kmph at 10^0 west of north while train B travels at 45 kmph at 60^0 east of north. Find the (i) Relative velocity of train A w.r.t. train B (ii) Distance between the two trains after 2 minutes.

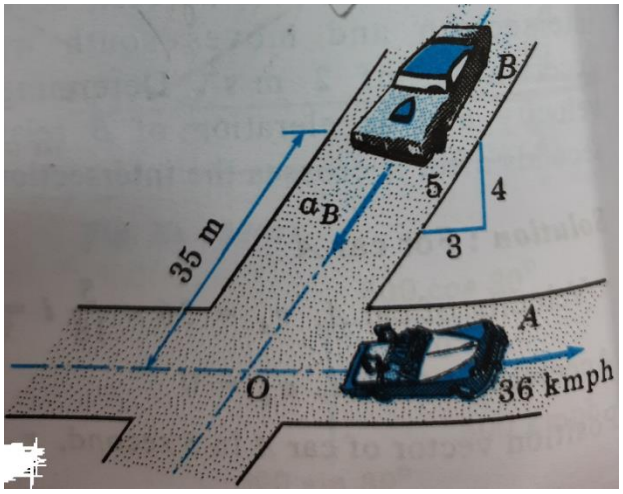
3. Planes A and B are flying at the same altitude. If their velocities are v_A = 600 kmph and v_B = 500 kmph, when the angle between their straight line course is 30^0 as shown in fig. Determine the velocity of plane A w.r.t. plane B, also determine the distance between them in t = 5 min.



4. Car A is traveling east at constant speed of 36 kmph. As car A crosses the intersection as shown in fig. car B starts from rest, 35 m north of the intersection and moves south with a constant acceleration of 2 m/s^2. Determine the position, velocity and acceleration of B relative to A, 5 sec. after car A crosses the intersection.



5. Fig. shows cars A and B at a distance of 35 m. Car A moves with constant speed of 36 kmph and car B starts from rest with an acceleration of 1.5 m/s^2. Determine relative position, velocity and acceleration of car B w.r.t. car A, 5 sec. after car A crosses the intersection.



6. Automobile A is traveling along a straight highway, while B is moving along a circular curve of 150 m radius. The speed of A is being increased at the rate of 1.5 m/s^2, and the speed of B is being decreased at the rate of 0.9 m/s^2. For the position shown in fig. determine the velocity of A relative to B. At this instant the speed of A is 75 kmph and speed of B is 40 kmph.