MEC3705 – DYNAMICS

KINEMATICS OF PARTICLES

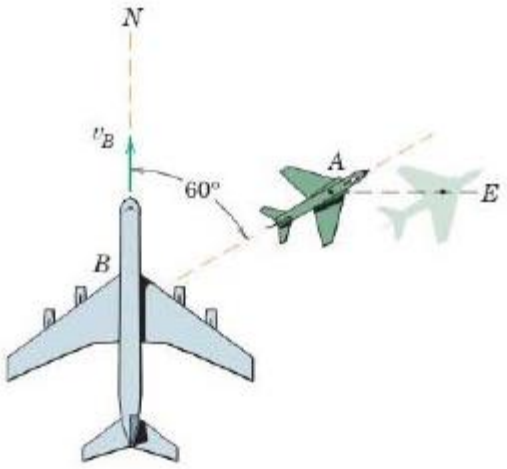
- **RELATIVE MOTION AND CONNECTED PARTICLES**

ASSIGNMENT 5 : Due: Thursday 19th September, 2024

INSTRUCTIONS: Please show your working clearly and use the SI units for all your calculations.

Question 1

2/190 The jet transport B is flying north with a velocity $v_B = 600$ km/h when a smaller aircraft A passes underneath the transport headed in the 60° direction shown. To passengers in B, however, A appears to be flying sideways and moving east. Determine the actual velocity of A and the velocity which A appears to have relative to B.



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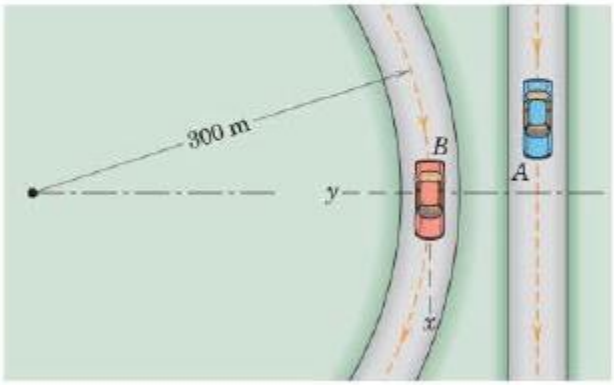
Question 2

2/193 For the instant represented, car A has a speed of 100 km/h, which is increasing at the rate of 8 km/h each second. Simultaneously, car B also has a speed of 100 km/h as it rounds the turn and is slowing down at the rate of 8 km/h each second. Determine the acceleration that car B appears to have to an observer in car A.

Ans. $\mathbf{a}_{B/A} = -4.44\mathbf{i} + 2.57\mathbf{j}$ m/s^2



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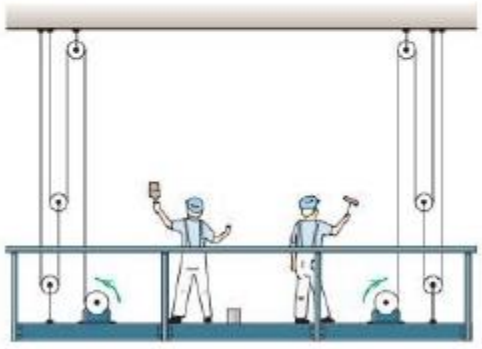
Question 3

2/225 The power winches on the industrial scaffold enable it to be raised or lowered. For rotation in the sense indicated, the scaffold is being raised. If each drum has a diameter of 200 mm and turns at the rate of 40 rev/min, determine the upward velocity v of the scaffold.

Ans. $v = 83.8$ mm/s



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