

國立成功大學

112學年度碩士班招生考試試題

編 號：135

系 所：航空太空工程學系

科 目：動力學

日 期：0206

節 次：第 2 節

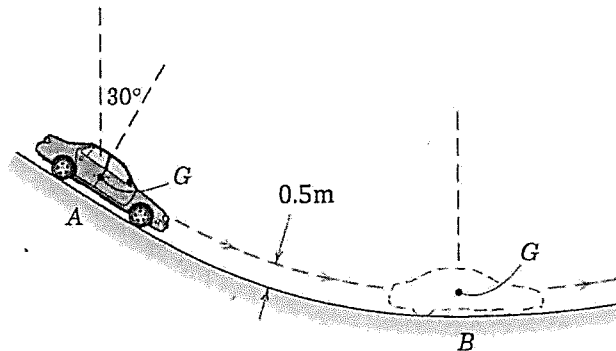
備 註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (30%) (a) An aircraft with the weight of 5000 Kg is flying at a constant speed of 350 km/h along a horizontal circular path (Level Flight). If the banking angle $\theta=30$ deg, determine the lift force L acting on the aircraft and the radius r of the circular path. Neglect the size of the airplane. (b) What is the turning rate of this aircraft? (c) A pilot weighs 70 Kg and is traveling at a constant speed inside loop of 300 km/h. Determine the normal force he exerts on the seat of the aircraft when he is upside down at the top of the loop. The loop has a radius of curvature of 500 m.
2. (20%) Ball A strikes ball B with an initial velocity in the horizontal plane. If both balls have the same mass and the collision is perfectly elastic, determine the angle after collision. Ball B is originally at rest. Neglect the size of each ball.

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

3. (20%) The mass center G of the car has a velocity of 10m/s at position A and 2 seconds later at B has a velocity of 20 m/s . Assume the car is travelling on a perfect circular curve, and the angular velocity at A is 0.25rad./s .
- Determine the radius of curvature of the road.
 - Calculate the angular velocity of the car at B .
 - Calculate average angular acceleration of the car between A and B .



4. (30%) A four-bar linkage is shown in the following figure. When link CB passes the vertical position, point A has a position of $x = -60\text{mm}$ and $y = 100\text{mm}$.
- Determine the angular velocity of BC at that instance if the drive link OA has a counterclockwise angular velocity $\omega_0 = 10\text{rad./s}$.
 - Subsequently, determine the angular acceleration of BC at that instance. You may present your answers in fractions.

