

淡江大學 105 學年度碩士班招生考試試題

34-1

系別：航空太空工程學系 B 組

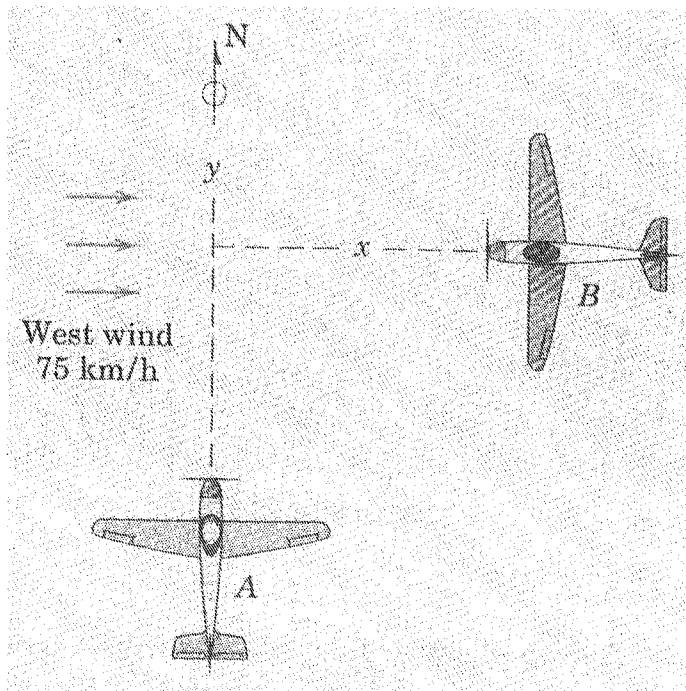
科目：動力學

考試日期：3 月 5 日(星期六) 第 2 節

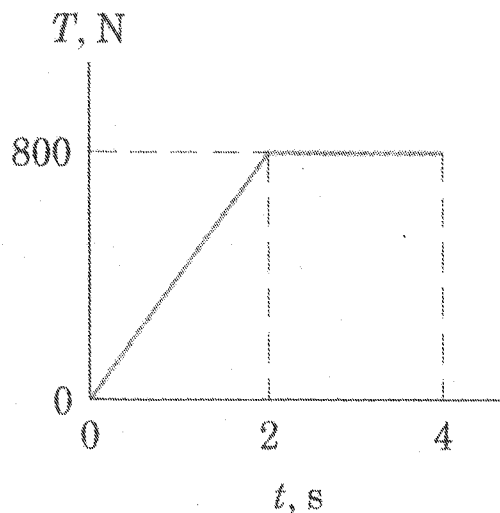
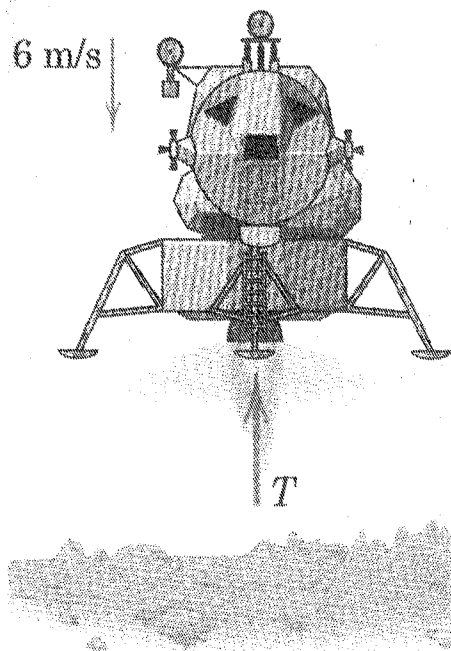
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本試題雙面印刷

1. The small airplane A initially flying north with a ground speed of 240 km/h encounters a 75 km/h west wind (blowing east). Airplane B flying west with an airspeed of 280 km/h passes A at nearly the same altitude. Determine the magnitude and direction of the velocity which A appears to have to the pilot of B .



2. The 250-kg lunar lander is descending onto the moon's surface with a velocity of 6 m/s when its retro-engine is fired. If the engine produces a thrust T for 4s which varies with the time as shown and then cuts off, calculate the velocity of the lander when $t = 5$ s, assuming that it has not yet landed. Gravitational acceleration at the moon's surface is 1.62 m/s^2 .



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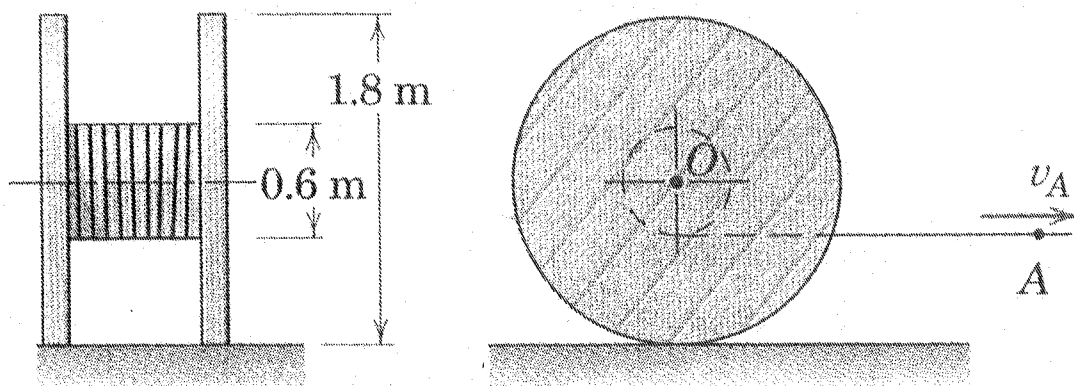
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3. The telephone-cable reel rolls without slipping on the horizontal surface. If point A on the cable has a velocity $v_A = 1.0$ m/s to the right, compute the velocity of the center O and the angular velocity ω of the reel. (Be careful not to make the mistake of assuming that the reel rolls to the left.)



4. The 20-kg solid circular disk is initially at rest on the horizontal surface when a 12-N force P , constant in magnitude and direction, is applied to the cord wrapped securely around its periphery. Friction between the disk and the surface is negligible. Calculate the angular velocity ω of the disk after the 12-N force has been applied for 2 seconds and find the linear velocity v of the center of the disk after it has moved 1.5 meters from rest.

