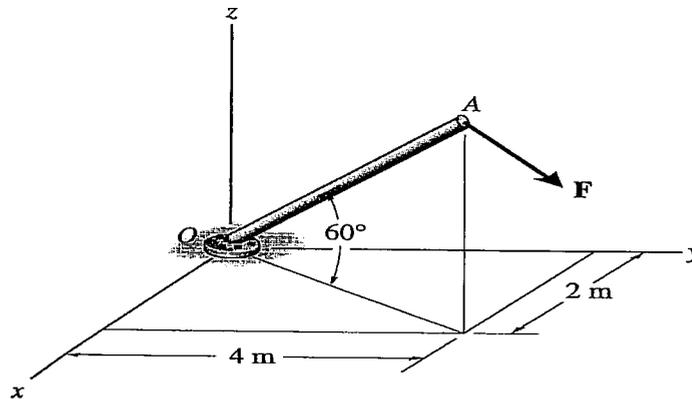


# 大同大學 九十二 學年度 轉學考試 試題

考試科目：工程力學 系別：機械工程學系 第 1 頁，共 2 頁

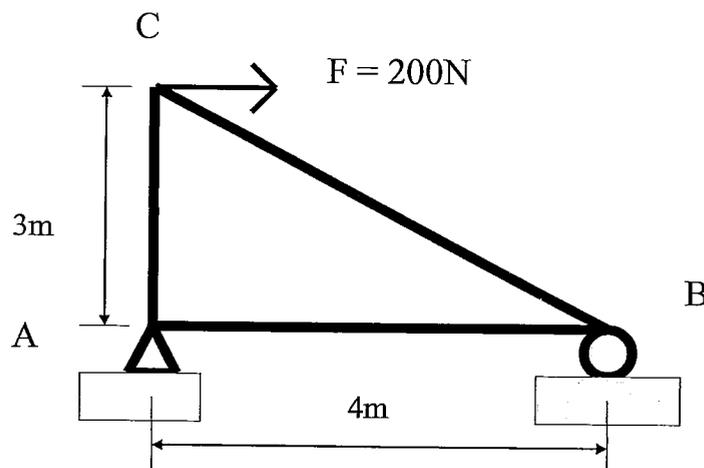
註：本次考試不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. (25%) If  $\mathbf{F} = \{ 16\mathbf{i} + 10\mathbf{j} - 14\mathbf{k} \}$  N, determine the magnitude of the projection of  $\mathbf{F}$  along the axis of the pole and perpendicular to it.

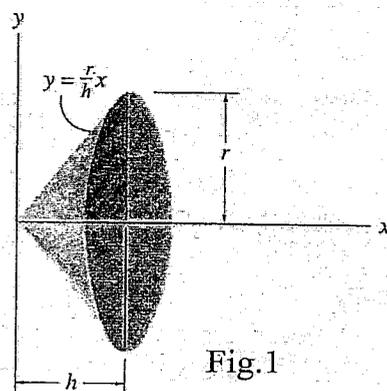


2. (25%) The structure is subjected to a force  $F$  at point C, a pin-jointed connection at point A, and a roller connection at point B as shown in the following figure.

- (a) Is this a statically determinate structure or a statically indeterminate structure? Why?  
 (b) Determine the reactions at points A and B.



3. (25%) The right circular cone is formed by revolving the shaded area around the  $x$  axis. As shown in Fig.1. Determine the moment of inertia  $I_x$  and express the result in terms of the total mass  $m$  of the cone. The cone has a constant density  $\rho$ .



# 大同大學 九十二 學年度 轉學考試 試題

考試科目：工程力學 系別：機械工程學系 第 2 頁，共 2 頁

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4. (25%) A hollow cylindrical steel shaft is 1.5 m long and has inner and outer diameters respectively equal to 40 and 60 mm. Knowing that the value of the modulus of rigidity of steel is 80 GPa, determine (a) what is the largest torque which may be applied to the shaft if the shearing stress is not to exceed 120 MPa? (b) what torque should be applied to the end of the shaft to produce a twist of  $2^\circ$ ? (c) what angle of twist will create a shearing stress of 70 MPa on the inner surface of the hollow steel shaft

