

臺灣綜合大學系統

108 學年度 學士班

轉學生聯合招生考試

試 題

類組：D37

科目名稱：應用力學

科目代碼：D3791

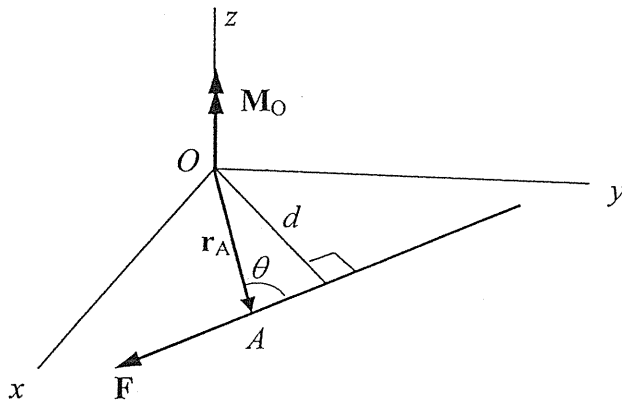
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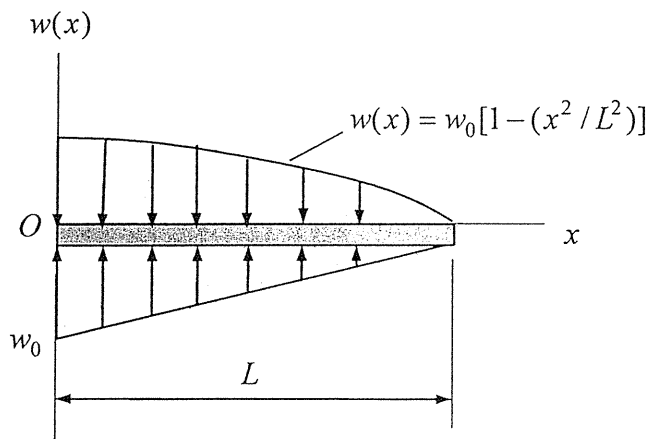
※本項考試依簡章規定各考科均「不可以」使用計算機

本科試題共計 2 頁

1. As shown in the figure, use the basic **definition of vector cross-product** and prove that the moment vector \mathbf{M}_O produced by force \mathbf{F} about the point O can be computed by the vector equation $\mathbf{M}_O = \mathbf{r}_A \times \mathbf{F}$. In the figure, point A is an arbitrary point on the line of action of force \mathbf{F} , \mathbf{r}_A is position vector from O to A , d is the shortest distance between line of action of the force and point O . (25%)



2. A cantilever beam is subjected to two distributed loads as shown. Replace the distributed loads by a resultant force and couple moment acting at point O . (25%)

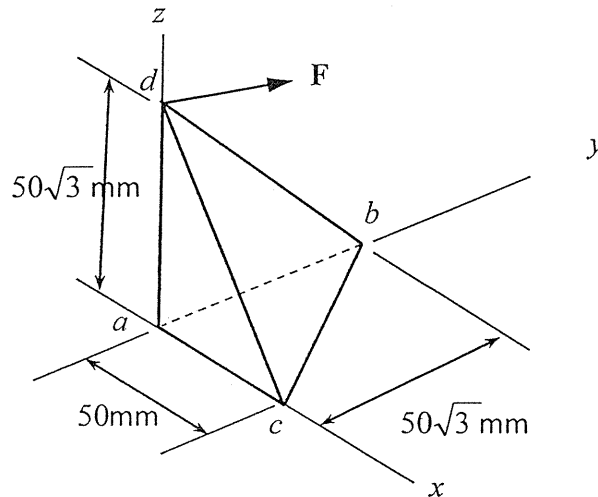


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3. A force F of a magnitude 100 N acts on the top of the tetrahedron $abcd$ as shown. Let the direction angles of vector F be $\alpha = 60^\circ$, $\beta = 60^\circ$, $\gamma = 45^\circ$. Use the 3D vector formula to determine the magnitude of the moment about the $b-c$ axis. In addition, determine the shortest distance between $b-c$ axis and the line of action of the force F ? (25%)



4. Use the **method of virtual displacement** and determine the required magnitude of force P to maintain the equilibrium of linkage at $\theta = 60^\circ$. The weight of each link is W . Point A is a hinge, point B is a pin and point C is a roller. (25%)

