

大同大學 98 學年度轉學入學考試試題

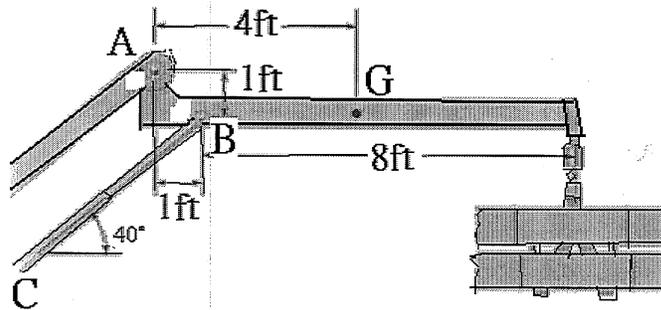
考試科目：工程力學

所別：機械工程學系

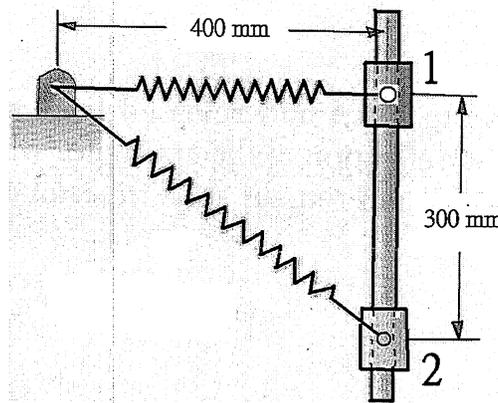
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註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 可以使用計算器

- (1) The articulated crane boom has a weight of 200 lb and mass center at G . If it supports a load of 1000 lb , determine the force acting at the pin A and the compression in the hydraulic cylinder BC when the boom is in the position shown.



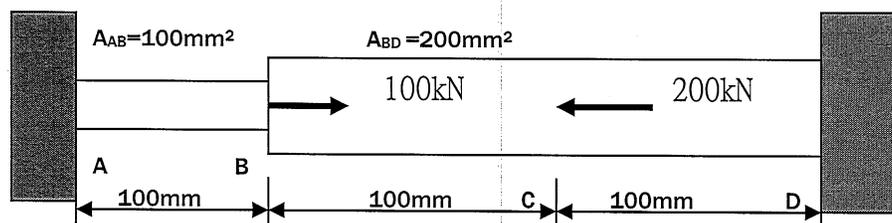
- (2) A 10 kg collar slides without friction along a vertical rod as shown. The spring attached to the collar has an undeformed length of 100 mm and a constant of 600 N/m . If the collar is released from rest in position 1, determine its velocity after it has moved 300 mm to position 2.



- (3) A step rod is made up of two uniform members as shown in the figure. The rod exactly fits between rigid walls and the ends of the rod are welds to the rigid walls.

(a) Is it a statically determinate structure or statically indeterminate structure? Why?

(b) Determine the reactions R_A and R_D at the fixed ends. Assume $E_{AB}=100\text{ GPa}$ for member AB and $E_{BD}=200\text{ GPa}$ for member BD .



- (4) The simple supported beam is made of timber that has an allowable tensile stress of $(\sigma_{\text{allow}})_T=12\text{ MPa}$, an allowable compressive stress of $(\sigma_{\text{allow}})_C=8\text{ MPa}$, and an allowable shear stress of $\tau_{\text{allow}}=4\text{ MPa}$. Determine the dimension of structure if it is to be rectangular and have a height-to-width ratio of $h/b=2.0$.

