中國文化大學 九十三 學年度 第一學期 期中 考試試卷					
考試科目	任課老師	系級	考試日期	份數	備註
應用力學	陳為仁	機一 A	93/11/16	65	可用計算機

1. The pin shown in Fig. 1 is subjected to two forces $\vec{F}_1$ and $\vec{F}_2$. (a) Determine the magnitude of the resultant $\vec{F}_R = \vec{F}_1 + \vec{F}_2$ and its direction measured clockwise from the positive u axis by using the parallelogram law and trigonometry, and (b) resolve the force $\vec{F}_2$ into components acting along the u and v axes.

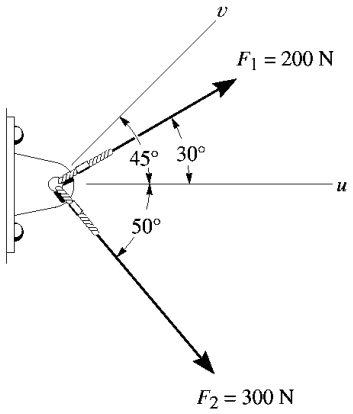

Fig.1

2. Two forces $\vec{F}_A$ and $\vec{F}_B$ act on the ring O as shown in Fig. 2. Determine the magnitude and the direction θ of the force $\vec{F}_A$ so that the resultant force of $\vec{F}_A$ and $\vec{F}_B$ is directed along the positive x axis and has a magnitude of 1500 N.

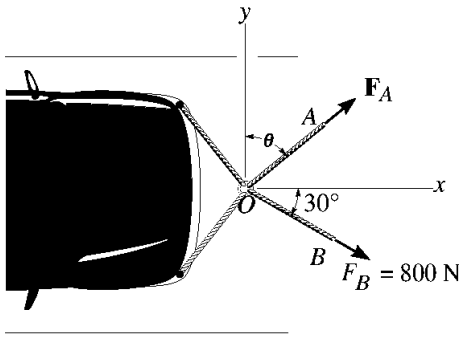

Fig. 2

3. The wall hook A is subjected to two forces along two cables AB and AC as shown in Fig. 3. (1) Express each force in Cartesian vector form, and (2) determine the magnitude and the coordinate direction angles of the resultant of the two forces.

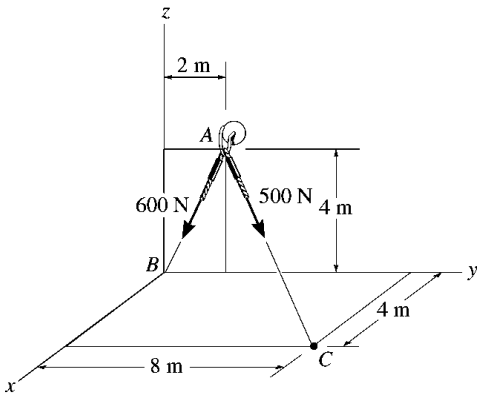

Fig. 3

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4. The 8-kg lamp suspended in the position as shown in Fig. 4 is in equilibrium. The undeformed length of spring AB is 0.5m, and the spring has a stiffness k_{AB} = 300 N/m.
   (1) Draw the free-body diagram for the ring at A.
   (2) Determine the forces in the cables AC and the spring AB.
   (3) Determine the stretch of the spring.
   (4) Determine the required length of cord AC so that the lamp is suspended in the position shown.

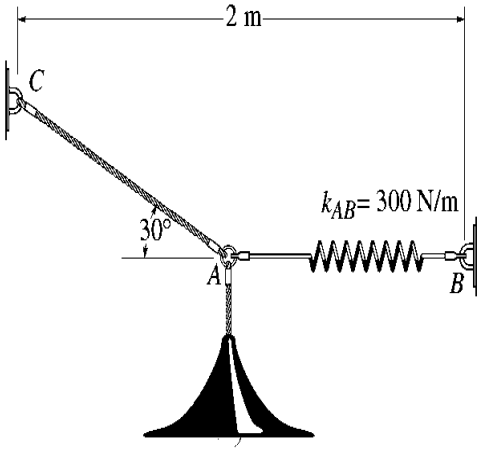

Fig. 4

5. Determine the magnitude of forces $\vec{F}_1$, $\vec{F}_2$ and $\vec{F}_3$ for equilibrium of the particle shown in Fig. 5.

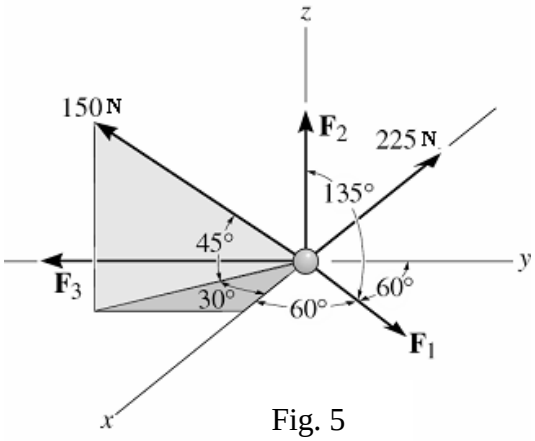

Fig. 5

6. Determine the smallest force F that must be applied to the rope, when held in the direction shown in Fig. 6, in order to cause the pole to break at its base O. This requires a moment M = 900 N-m to be developed at the base O.

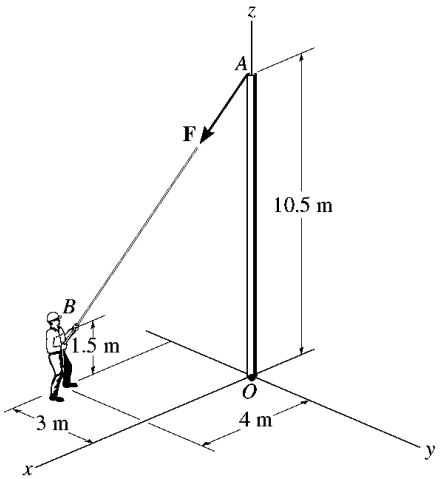

Fig. 6