題號： 225
科目：應用力學(A)
節次： 7

國立臺灣大學 102 學年度碩士班招生考試試題

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1. Please complete the following: (40%)

    a. Explain what the *Poisson's Ration* is; (5%)

    b. Explain the *Newton's Three Laws of Motion*; (5%)

    c. The following equation is a form of the Hook's Law, in which E is the *Young's Modulus*. Please explain what is the function's meaning in physics, and what are the parameters τ, v and γ. (15%)

    $$\tau = \frac{E}{2(1+v)}\gamma$$

    d. Please explain what is the meaning of the following equation, where ρ is the material density and V is the volume. (15%)

    $$\frac{\partial}{\partial t}\int \rho dV = 0$$

2. Please determine the functions for the Shear and Bending-Moment for the beam shown in Figure 1. Please plot the Shear and Bending-Moment diagrams for the beam using the functions you previously derived. (30%)

3. In Figure 2 is a tractor that exerts a towing force $T = 400lb$. Please determine the normal reactions at each of the two front and two rear tires and the tractive frictional force F on each rear tire needed to pull the load forward at constant velocity. The tractor itself weights $7500lb$ and a center of gravity located at G_r. An additional weight of $600lb$ is added to its front having a center gravity at G_A. Take the friction coefficient to be $\mu_s = 0.4$. The front wheels are free for rolling. (30%)
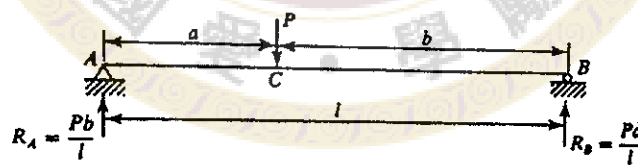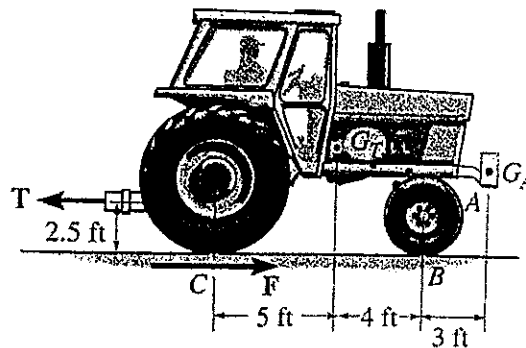

Figure 1

Figure 2

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