國立成功大學 104 學年度碩士班招生考試試題

系所組別：航空太空工程學系在職專班乙組

考試科目：普通物理(專班)　　考試日期：0211，節次：3

※考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. A uniform ladder of length l rests against a smooth, vertical wall (Fig. 1). The mass of the ladder is m, and the coefficient of static friction between the ladder and the ground is μ_s=0.4. (a) Draw the free body diagram for the ladder in equilibrium (5%). (b) From the free body diagram, determine the the force exerted by the wall on the ladder in terms of μ_s and m (10%). (c) For the minimum angle $\theta_{min}=\tan^{-1}(K)$ at which the ladder does not slip, what is the value of "K"? (10%)

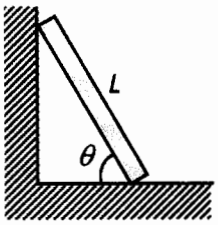


Fig. 1

2. A block with m=200 grams connected to a light spring for which the stiffness constant is 5.0 N/m is free to oscillate on a horizontal, frictionless surface. The block us displaced A=5.0 cm from equilibrium and released from rest as in Fig. 2. (a) Find the period of the motion. (5%) (b) Determine the maximum speed of the block. (5%) (c) What is the maximum acceleration of the block? (5%) (d) Express the position, velocity, and acceleration as functions of time (10%).

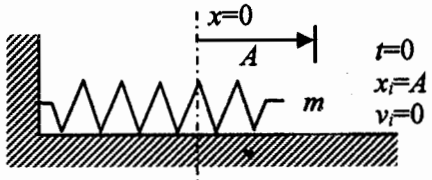
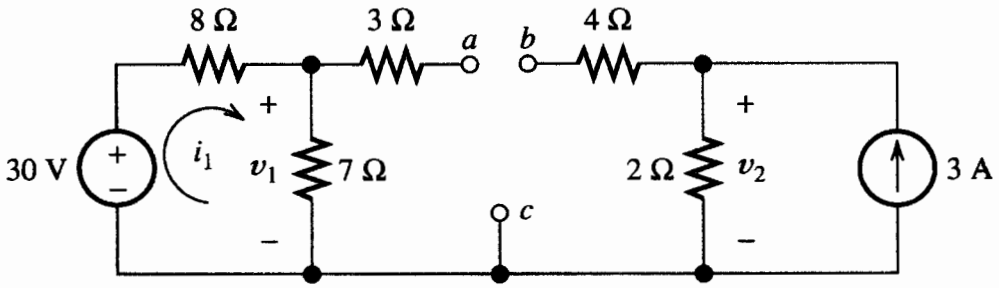


Fig. 2

3. (25%) Find v_1, v_2, v_{ab}, v_{bc}, and v_{ca} in the following circuit。



4. (25%) Find the energy stored in the capacitors and inductors under DC condition in the following circuit.