編號： 336 國立成功大學109學年度碩士班招生考試試題

系　　所：口腔醫學研究所

考試科目：普通物理學　　考試日期：0211，節次：3

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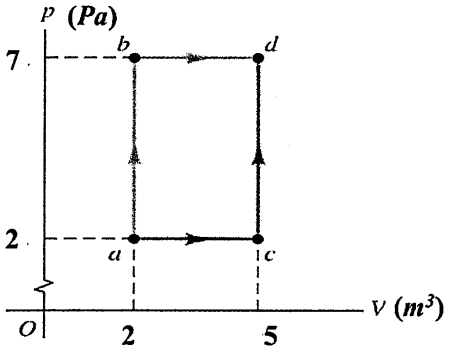
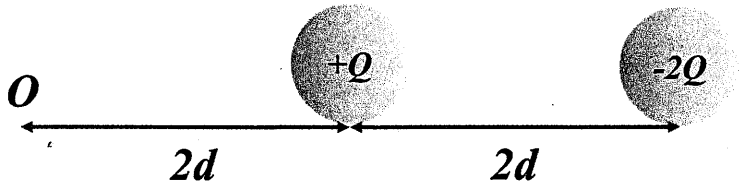
※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. One rope is wiggled with frequency f = 3 Hz, amplitude A = 2 m, and wave speed v = 6 m/s. What is the mathematical description of this wave? (10%)
2. Please derive Bernoulli's equation. (10%)
3. A Carnot engine takes 1700 J of heat from a reservoir at 600 K, does some work, and discards some heat to reservoir at 450 K. What is its efficiency? (10%)
4. Please describe the pV-diagram for the Carnot cycle. (10%)
5. The aluminum cylinder is 0.1 m square and 0.5 m long. What is the force exerted on its ends if the elongation is 0.2 mm? (Young's modulus of aluminum is 7.0×10^{10} Pa) (10%)
6. One surface is remained at temperature of 300 K and it's heat current in radiation is *H*. When it was heated to 900K, what is the heat current in radiation of this surface comparing to that at 300 K? (10%)
7. In process *ab*, 30 J of heat is added to the system. In process *bd*, 60 J of heat is added to the system. Find the internal energy change in process *acd*? (15%)



8. There are two point-charges +Q, and -2Q located at the distance *2d,* and *4d* from the origin *O*, respectively. What is the electric field at the origin *O?* (Vacuum permittivity is ε_0) (15%)



9. There is an imaginary sphere or radius *R* and a point-charge +q is located at the center of this sphere. The electric flux through this sphere is Φ. What is the electric flux through the sphere with radius 4*R* and a point-charge +q is also located at the center of this sphere? (10%)