**Mansoura University**
**Faculty of Engineering**
**Mech. Eng. Dept.**

**Rotating Machines**
**Master Degree**
**Time Allowed: 3 hrs**
**September 2013**

***Open book exam. All documents are authorized***

**1) The basic-loading distribution of an infinitely thin airfoil is to be:**

$$(P_1 - P_2)/(\rho C_o^2/2) = Const.$$

**from leading edge to half chord, then linearly decreasing to zero (rooftop distribution). The total lift coefficient $C_L$ is to be 1.5 at the ideal incidence. Find the shape of the camber line, the ideal-incidence angle and the zero-lift angle.**

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**2) If the airfoil in problem used in axial pump. The rotating velocity is 1500 R.P.M. The shaft diameter is 10 cm, the outer diameter 30 cm the discharge is 40 l/s. Find power required to drive the pump and the head developed.**

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