

# 平成14年度博士前期課程入学試験問題

機能機械学 専攻		受験番号	
試験科目	英語	2枚中の1	

I 次の英文を読んで、以下の問いに答えなさい。

The tuft method is one of the earliest techniques of surface flow visualization. In its simplest form, the method can be implemented with almost no special effort, using readily available materials and equipment. Tufts are point indicators of the local flow direction. They are most often used to distinguish between attached and separated flow. Each tuft can depict the flow conditions at only one location. Visualizing the flow over a surface requires that an array of tufts be applied. The spatial resolution of the visualization experiment is determined by the number density of the tuft array.

Conventional tufts are such simple and obvious devices that it may seem that the technique needs no particular description. We shall see, however, that this apparent simplicity is somewhat deceiving. (a) Tufts are short pieces of flexible string or yarn attached to an aerodynamic surface in such a way that they can move freely under the influence of the flow. They can range in size from hairlike fibers to thick ropelike yarn. They are equally effective in gas or liquid flows. The effectiveness of tufts in indicating the flow properties depends on the distinctive behavior of the tuft material under the various conditions. (b) In steady attached flow, tufts remain relatively stationary and become aligned with the flow direction. When they are installed in a dense array, their indicated direction is very well correlated with neighboring tufts. In separated flow, tufts generally develop distinctive unsteady motions and show large deviations in the indicated flow direction from the free-stream direction and from neighboring tufts.

One of the fundamental considerations in conventional tuft techniques is the requirement that their behavior be visually observed. Every tuft experiment has a basic dimensional scale that is best expressed by the distance from which the tufts must be observed. (c) The greater the observation distance the greater tuft material must be. This factor influences all the other factors important in selecting the size relationship of the tufts to the aerodynamic surface, i.e., tuft length, diameter, spacing, and the resulting intrusiveness of the experiment.

1) 下線部(a)を日本語に訳しなさい。

2) 下線部(b)を日本語に訳しなさい。

3) 下線部(c)を説明しなさい。