BBL 4321

Fluid Solid Systems

Major Examination

$v_g \left(\frac{2\pi n\omega^2}{g}\right)(R_0^2 - R_i^3)\cot\phi$

Marks 10 **Time 30 minutes**

1. Derive the relation between volumetric capacity and the sigma (Σ) factor of the disc bowl centrifuge. [5]

Q Σ

2. A bowl centrifuge is used to concentrate a suspension of *E. coli* prior to cell disruption. The bowl of this unit has an inside radius of 12.7 cm and a length of 73.0 cm. The speed of bowl is 16000 rpm and the volumetric capacity is 200 l/h. Under these conditions, this centrifuge works well.

(i) Calculate the settling velocity for the cells.

(ii) After disruption the diameter of debris is changed to about one-half of the original cell diameter and the viscosity is increased four times. Estimate the volumetric capacity of this same centrifuge operating under these new conditions.

[5]