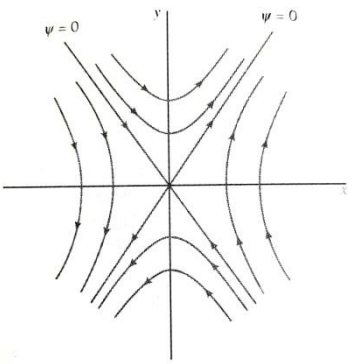
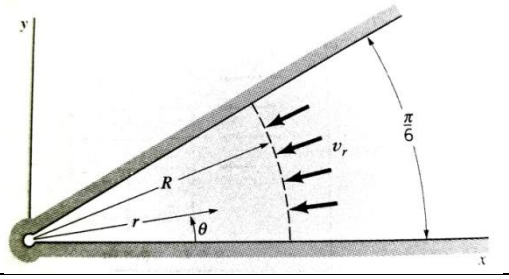
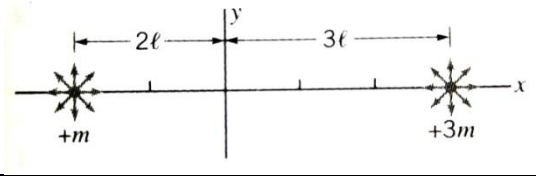
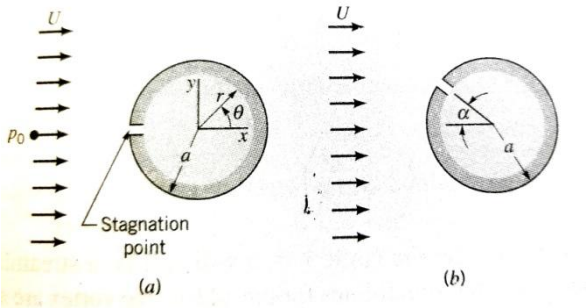
Minor Test-1, Fluid Mechanics-II

Answer **any five** questions. Total Marks – 10, Time = 45minutes

There is no mark for correct answer with a wrong justification.

<table>
<tr><td colspan="3">Answer true or false and justify your answer.</td></tr>
<tr><td>1</td><td>velocity field for figure-1 is u=2y, v=4x</td><td> 
</td></tr>
<tr><td>2</td><td>A nonviscous, incompressible fluid flows between wedge-shaped walls into a small opening as shown in figure. The velocity potential (in m^2/s) that approximately describe this flow is ø=-2ln(r). Then the volume flow rate per unit length into the opening is $-(\pi/3)$ m^2/s</td><td> 
</td></tr>
<tr><td>3</td><td>A sailing ship without sails is possible.</td><td></td></tr>
<tr><td></td><td>Two sources, one of strength m and the other with strength 3m are located on the x axis as shown in figure. Then stagnation point will be exactly at the middle i,e equidistance from the sources.</td><td> 
</td></tr>
<tr><td>4</td><td>When a circular cylinder is placed in a uniform stream, a stagnation point will be created on the cylinder as shown in figure. If a small hole is located at this point, then the stagnation pressure P_{stag} can be measured and can be used to determine the approach velocity U using relation $U=\left[\frac{2}{\rho}\left(p_{stag}-p_o\right)\right]^2$</td><td rowspan="2"> 
</td></tr>
<tr><td>5</td><td>If the cylinder is misaligned by an angle α, figure-b, but the measured pressure is still interpreted as the stagnation pressure, then the expression for the ratio of the true velocity, U and to the predicted velocity U’ can be expressed as $\frac{U}{U'}=\left(1-4\sin^2\alpha\right)^{-1/2}$</td></tr>
<tr><td>6</td><td>The velocity distribution in the boundary layer is given by: $\frac{u}{U}=\frac{y}{\delta}$, where, u is the velocity at a distance y from the plate and u=U at y=δ, δ being boundary layer thickness. Then the value of $\frac{\delta*}{\theta}$ is 0.5</td><td></td></tr>
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