**ASSIGNMENT**

1a.

i) Conditions for Couette flow are:

Velocity is defined by

Flow rate is defined by

Shear stress is defined by

ii) Four conditions that can be used to determine the nature of flow are:

Pipe diameter

Velocity of the flow

Viscosity of the fluid

Density of the fluid

iii)

|  |  |
| --- | --- |
| **Aerofoil** | **Hydrofoil** |
| The working fluid is air or gas | The working fluid is water |
| Operates at lower speeds | Operates at higher speeds |
| Forces experienced on aerofoils are much lesser than those on aerofoil | Forces experienced on hydrofoils are 800 times greater than that on aerofoils |
| Aerofoils do not experience cavitations. | Hydrofoils can be subject to cavitations. |
| Aerofoils are used on wingtips of aircraft | Hydrofoils are used on rudders of boats. |

1b.

b = 10mm = 0.01m

= 1m/s

= 0.9 centipoise =

i) q = b =

0.0067 =

7.236

ii)

@y = 0,

iii)

2

a) (i) Velocity distribution:

(ii) Shear stress distribution

b) umax (maximum velocity) = 1.12 m/s,

c) Shear stress at the upper plate: = - 0.78 N/m2