**REG.NO:**

**SEMBODAI RUKMANI VARATHARAJAN ENGINEERING COLLEGE**

**ACADEMIC YEAR 2013-2014/ODD SEMESTER**

**CYCLE TEST – I**

**DEPARTMENT OF MECHANICAL ENGINEERING**

SET-A

**SUBJECT CODE/TITLE:** ME 2204 FLUID MECHANICS AND MACHINERY

**YEAR/SEM:** II/III **DATE:**

**DURATION:** 90 Mins **MAX.MARKS:** 50

 **PART-A**

 ( 05X2 = 10 marks)

1)State Buc kingham’s Π theorem?

2)Mention the general characteristics of laminar flow.

3)Write down the Navier -stokes equation

4)What is boundary layer?

5)Define drag and lift?

 **PART-B**

 (8+16+16 = 40 marks)

1. a) Derive an expression for the velocity distribution for viscous flow

through a circular pipe. (8)

b) A main pipe divides into two parallel pipes, which again forms one

pipe. The length and diameter for the first parallel pipe are 2000m and 1m

respectively, while the length and diameter of second parallel pipe are 2000

and 0.8 m respectively. Find the rate of flow in each parallel pipe, if total

flow in the main is 3 m³/s. Thecoefficient of friction for each parallel

pipe is same and equal to 0.005.(8)

**or**

2. Two pipes of 15 cm and 30 cm diameters are laid in parallel to pass a

total discharge of 100 liters/ second. Each pipe is 250 m long. Determine

discharge through each pipe. Now these pipes are connected in series to

connect two tanks 500 m apart, to carry same total discharge. Determine

water level difference between the tanks. Neglect minor losses in both

cases, f=0.02 fn both pipes. (8)

b) A pipe line carrying oil of specific gravity 0.85, changes in diameter

from 350 mm at position 1 to 550 mm diameter to a position 2, which is at

6 m at a higher level. If the pressure at position 1 and 2 are taken as 20

N/cm2 and 15 N/ cm2 respectively and discharge through the pipe is 0.2

m³/s. determine the loss of head. (8)

3. Obtain an expression for Hagen- Poisulle flow. Deduce the condition of

maximum velocity. (16)

**or**

4. A flat plate 1.5 m X 1.5 m moves at 50 km / h in a stationary air

density 1.15 kg/ m³. If the coefficient of drag and lift are 0.15 and 0.75

respectively, determine (i) the lift force (ii) the drag force (iii) the resultant

force and (iv) the power required to set the plate in motion .(1 6)

5. a). The rate of flow of water through a horizontal pipe is 0.3 m³/s. The

diameter of the pipe is suddenly enlarged from 25 cm to 50 cm. The pressure intensity in the smaller pipe is 14N/m². Determine (i) Loss of head

due to sudden enlargement. (ii) Pressure intensity in the large pipe and (iii)

Power lost due to enlargement. (8)

**or**

b) Water is flowing through a tapering pipe of length 200 m having

diameters 500 mm at the upper end and 250 mm at the lower end, the pipe

has a slope of 1 in 40. The rate of flow through the pipe is 250 lit/ sec. the

pressure at the lower end and the upper end are 20 N/cm² and 10 N/cm²

respectively. Find the loss of head and direction of flow (8)