**REG.NO:**

**SEMBODAI RUKMANI VARATHARAJAN ENGINEERING COLLEGE**

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

**CYCLE TEST – I**

**DEPARTMENT OF MECHANICAL ENGINEERING**

SET-B

**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.Define displacement thickness

2.Define momentum thickness.

3.Define energy thickness

4.What is dimensionless number?

5.Check the dimensional homogeneity for the equation V=u+at

**PART-B**

(8+16+16 = 40 marks)

1)A horizontal pipe of 400 mm diameter is suddenly contracted to a

diameter of 200 mm. The pressure intensities in the large and small pipe is

given as 15 N/cm² and 10 N/cm² respectively. Find the loss of head due to

contraction, if Cc=0.62, determine also the rate of flow of water. (16)

**or**

2)Determine the length of an equivalent pipe of diameter 20 cm and friction

factor 0.02 for a given pipe system discharging 0. 1m³/s. The pipe system

consists of the following: (16)

(i) A 10 m line of 20 cm dia with f=0.03

(ii) Three 90º bend, k=0.5 for each

(iii) Two sudden expansion of diameter 20 to 30 cm

(iv) A 15 m line of 30 cm diameter with f=0.025 and

(v) A global valve, fully open.

**or**

3.a)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)

**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 .(16)

4.Derive an expression for the velocity distribution for viscous flow

through a circular pipe. (8)

**or**

5. 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)