# JC Bose UNIVERSITY OF SCIENCE & TECHNOLOGY, YMCA FARIDABAD

## DEPARTMENT OF MECHANICAL ENGINEERING

Semester: III

Class test: 1

Note: Attempt all questions

Subject: Fluid Mechanics and Fluid Machines PCC-ME-303/21

Time 1.5 hrs

Max Marks: 30

Q1.  Define Surface Tension, Specific volume, Dynamic and Kinematic viscosity.   10   CO1

A solid cylinder 4m in diameter and 4m high is floating in water with its axis vertical. If the specific gravity of the material of cylinder is 0.6, find its meta-centric height. State also whether the equilibrium is stable or unstable.

Q.2  State the Bernoulli's theorem. An oil of specific gravity 0.8 is flowing through a venturi meter   10   CO2
having inlet diameter 20 cm and throat diameter 10 cm. The oil mercury differential manometer shows a reading of 25 cm. Discharge through the venturimeter is 70.5 litres/sec. Calculate the coefficient of discharge. specific gravity of Mercury is 13.6.

3   Drive Darcy Weisbach equation.

10   CO3

Semester: III

Class test: 2

Note: Attempt all questions

Subject: Fluid Mechanics and Fluid Machines PCC-ME-303/21

Time 1.5 hrs

Max Marks: 30

Q1.a) Define and explain Reynold's number, Froude's number's and Mach number.     10   CO4
b) Using Buckingham's pi-theorem, show that the discharge Q consumed by an oil ring is given by

$$Q = Nd^3 \phi \left[ \frac{\mu}{\rho N d^2}, \frac{\sigma}{\rho N^2 d^3}, \frac{w}{\rho N^2 d} \right]$$

where d is the internal diameter of the ring, N is rotational speed, p is density, μ is viscosity, σ is surface tension and w is the specific weight of oil.

Q.2 Define the term 'Governing of a turbine'. Describe with a neat sketch the Governing of   10   CO5
a Pelton turbine'

Q3 A double-acting reciprocating pump, running at 40 r.p.m., is discharging 1.0 m³ of water   10   CO6
per minute. The pump has a stroke of 400 mm. The diameter of the piston is 200 mm.
The delivery and suction head are 20 m and 5 m respectively. Find the slip of the pump
and power required to drive the pump