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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth semester B.Tech examinations (S), September 2020

Course Code: ME200

Course Name: FLUID MECHANICS AND MACHINERY (MC, SF)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three questions. Each question carries 10 marks.

- 1 a) The viscosity of a gas increases with increase in temperature while that of a liquid (5)
decreases with increase in temperature. Justify.
- b) Determine the viscosity of a liquid having kinematic viscosity 6 stokes and (5)
specific gravity 1.9.
- 2 a) Define surface tension. Prove that the relationship between surface tension and (5)
pressure inside a droplet of liquid in excess of outside pressure is given by $p = \frac{4\sigma}{d}$
- b) If the specific gravity of a liquid is 0.80, determine its mass density, specific (5)
volume and weight density.
- 3 State and prove Pascal's law. (10)
- 4 With neat sketches, explain the conditions of equilibrium for (10)
i. Submerged body ii. Floating body

PART B

Answer any three questions. Each question carries 10 marks

- 5 a) With the help of neat sketch, explain Reynold's experiment and the significance (6)
of Reynolds number.
- b) Distinguish between i. streamline and streak line flow ii. steady and unsteady (4)
flow
- 6 The water is flowing through a taper pipe of length 100 m having diameters 600 (10)
mm at the upper end and 300 mm at the lower end, at the rate of 50 litres/s. The
pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the
higher level is 19.62 N/cm^2 .
- 7 What is a venturimeter? Derive an expression for rate of flow through (10)
venturimeter.

- 8 What do you mean by separation of boundary layer? What is the effect of pressure gradient on boundary layer separation? (10)

PART C

Answer any four questions. Each question carries 10 marks.

- 9 Distinguish between impulse and reaction turbines. Explain the working of a tangential flow impulse turbine. (10)
- 10 A Kaplan turbine develops 24647.6 kW power at an average of 39 metres. Assuming a speed ratio of 2, flow ratio of 0.6, diameter of the boss equal to 0.35 times the diameter of the runner and an overall efficiency of 90%, calculate the diameter, speed and specific speed of the turbine. (10)
- 11 a) What is a draft tube? What are its functions in a turbine? (4)
b) Explain i. Restricted orifice surge tank ii. Differential surge tank (6)
- 12 Explain the working of a single stage centrifugal pump. List the advantages of centrifugal pump over reciprocating pump. (10)
- 13 a) What is a casing? What are the functions of casing in a centrifugal pump (4)
b) Explain the different types of casing used in a centrifugal pump. (6)
- 14 A single acting reciprocating pump, running at 60 r.p.m delivers 0.53 m^3 of water per minute. The diameter of the piston is 200 mm and stroke length 300 mm. The suction and delivery heads are 4 m and 12 m respectively. Determine : (10)
- i. Theoretical discharge
 - ii. Co-efficient of discharge
 - iii. Percentage slip of the pump and
 - iv. Power required to run the pump