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Total Number of Pages : 01

B.Tech
BEME2209

4th Semester Back Examination 2018-19

FLUID MECHANICS AND MACHINES

BRANCH : AEIE, EIE, ELECTRICAL, IEE

Time : 3 Hours

Max Marks : 70

Q.CODE : F904

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

- Q1** Answer the following questions : (2 x 10)
- a) Define kinematic viscosity and explain the significance of the same.
 - b) Define centre of buoyancy.
 - c) Describe Archimedes' principle.
 - d) What is manometer?
 - e) Define specific gravity.
 - f) Explain Bernoulli's equation.
 - g) Distinguish notch and weir.
 - h) What is overall efficiency of turbine?
 - i) What is pitot tube?
 - j) What is cavitation? Where does it occur in centrifugal pumps?
- Q2**
- a) Describe atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure (5)
 - b) Derive the expression for the flow through venturi meter. (5)
- Q3**
- a) Write short note on orifice meter. (5)
 - b) Derive the expression for specific speed of turbine. (5)
- Q4**
- a) What is metacentric height? How it related to stability of floating body? (5)
 - b) A liquid with specific gravity 0.8 flows at the rate of 3 l/s through a venturimeter of diameters 6 cm and 4 cm. If the manometer fluid is mercury (sp. gr = 13.6), determine the value of manometer reading, h. (5)
- Q5**
- a) Write down the working principle of positive displacement pump. (5)
 - b) What are the different parts of centrifugal pumps? Explain. (5)
- Q6** The following details are available about a Francis turbine. Diameters are 2.25 m and 1.5 m. Widths are 0.25 m and 0.375 m. The guide blade outlet angle is 18° runner blade angle is 85°. Both angles with the blade velocity direction. Frictional loss is 15% of the pressure head available between the inlet and outlet of the runner is 60 m. Calculate the speed and output of the turbine. Also find the blade outlet angle. Mechanical efficiency is 92%. Blade thickness blocks the flow area by 8%. (10)
- Q7** Oil flows through a horizontal pipe which has a diameter of 0.45 m at the start. After some distance the diameter reduces to 0.3 m at which point the flow divides into pipes of 0.15 m and 0.225 m diameter. The velocity at the beginning is 1.8 m/s. The velocity in the pipe line of 0.225 m dia is 3.6 m/s. If the pressure at the start is 20 m head of oil and the specific gravity of the oil is 0.91 determine the pressure at the fork and also at the end of the two branch pipes. Neglect losses. (10)
- Q8** Write short answer on any TWO : (5 x 2)
- a) Hydraulic torque converter
 - b) Differential manometer
 - c) Hydraulic ram