Roll No. .....

Total No. of Questions : 5] [Total No. of Printed Pages : 4

EGS-297

B.E. 4th Semester (CGPA) Civil Engg.
(Zero Sem.) Examination–2018
FLUID MECHANICS–I
Paper–CE–403

Time : 3 Hours] [Maximum Marks : 60

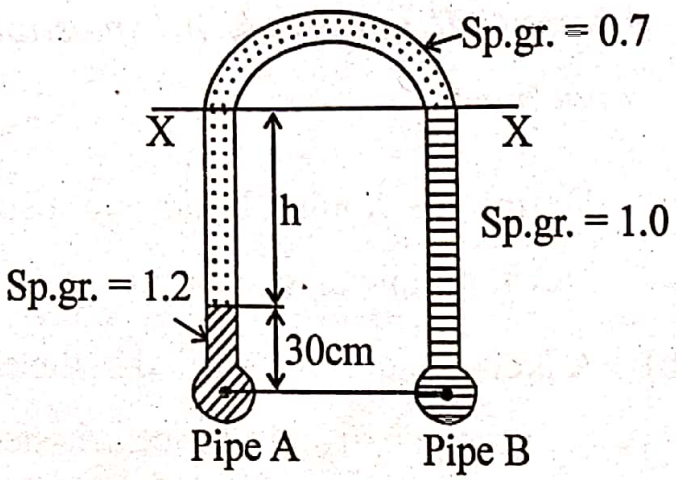
Note : Attempt all questions. All questions carry equal marks.

1. (a) Define Newtonian Fluid and also explain Newton's law of viscosity. 6

(b) A Newtonian fluid is filled in the clearance between a shaft and a concentric sleeve. The sleeve attains a speed of 50 cm/s. When a force of 40 N is applied to the sleeve parallel to the shaft. Determine the speed if a force of 200 N is applied. 6

or

Find out the differential reading 'h' of an inverted U-tube manometer containing oil of specific gravity 0.7 as the manometric fluid when connected across pipes A and B as shown in fig. below, conveying liquid of specific gravities 1.2 and 1.0 and immiscible with manometric fluid. Pipes A and B are located at the same level and assume the pressures at A and B to be equal. 12



Figure

2. Derive the equation of continuity for one and three dimensional flow and define velocity potential. 12

or

Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passing through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one third of flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE. 12

3. Explain Bernoullis equation and practical application of Bernoullis equation and Expression for rate of flow throughout venturimeter. 12

or

A pipeline carrying oil of specific gravity 0.87, change in diameter from 200 mm diameter at a position A to 500 mm diameter at position B which is 4 metres at a higher level. If the pressure at A and B are 9.81 N/cm^2 and 5.886 N/cm^2, respectively and discharge is 200 litres/s. Determine the loss of head and direction of flow. 12

4. Explain Buckingham's π-theorem and procedure for solving problems by Buckingham's π-theorem. 12

or

The pressure difference ΔP in a pipe of diameter D and length ℓ due to turbulent flow depends on the velocity v, viscosity μ, density ρ and roughness k. Using Buckingham's π theorem obtain an expression for ΔP. 12

5. Define Laminar flow and Expressions for loss of head due to Friction in pipe. 12

or

A Rough pipe of diameter 400 mm and length 1000 m carries water at the rate of 0.4 m^3/s. The wall roughness is 0.012 mm. Determine the coefficient of friction, wall shear stress centre-line velocity and velocity at a distance of 150 mm from the pipe wall. 12