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| **Q.NO.** | | **QUESTION** | **MARKS** | **YEAR** |
| **1** | **(a)** | Define and differentiate absolute and gauge pressures | **6** | **2016** |
|  | **(b)** | A U-tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and the right limb is open to the atmosphere. The centre of the pipe is 100 mm below the level of mercury (G=13.6) in the right limb. If the difference of mercury level in the two limbs is 160mm, determine the absolute pressure of the oil in the pipe. | **6** |
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| **2** |  | Two large fixed parallel plates are 12 mm apart. The space between the surfaces is filled with oil of viscosity 0.972 Ns/m2. A flat thin plate 0.25 m2 area moves through the oil at a velocity of 0.3 m/s. Find the drag force when the thin plate is at a distance of 3mm from one of the plane surfaces. | **12** | **2015** |
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| **3** | **(a)** | Explain the property ‘viscosity’ with respect to fluids | **6** | **2014** |
|  | **(b)** | A vertical cylinder of diameter 180 mm rotates concentrically inside another cylinder of diameter 181.2 mm. Both the cylinders are 300 mm high. The space between the cylinders is filled with a liquid whose viscosity is unknown. Find the viscosity of the fluid if a torque of 20 Nm is required to rotate the inner cylinder at 120 rpm. | **6** |
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| **4** | **(a)** | Monometers are devices which are used for pressure measurement in fluids. Explain in case of vertical single column manometer and inverted U-tube differential manometers. | **6** | **2013** |
|  | **(b)** | A hydraulic press has a ram of 20 cm diameter and a plunger of 3 cm diameter. It is used for lifting a weight of 30 kN. Find force required at the plunger. | **6** |
| Continued…. | | | | |
| **Q.NO.** | | **QUESTION** | **MARKS** | **YEAR** |
| **5** | **(a)** | Obtain an expression for the bulk modules of elasticity (K) of a fluid in terms of pressure (p) and the mass density (ρ). | **6** | **2012** |
|  | **(b)** | Calculate the capillary rise ‘h’ in a glass tube of 3 mm diameter when immersed in water at 20 0C. Take ‘σ’ for water at 20 0C as 0.0075 kg(f)/m. What will be percentage increase in value of ‘h’ if the diameter of glass tube is 2 mm. | **6** |
| **6** |  | Draw a neat sketch of micro-manometer and obtain the manometric equation | **6** |
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| **7** | **(a)** | Enumerate Newton’s law of viscosity and distinguish between Newtonian and Non-Newtonian fluids. | **6** | **2011** |
|  | **(b)** | A U tube is made of two capillaries of bore 1 mm and 2 mm respectively. The tube is held vertically and partially filled with liquid of surface tension 49 dynes per cm and zero contact angles. Calculate the density of the liquid if the difference in the levels of the menisci is 1.25 cm | **6** |
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| **8** | **(a)** | How do you classify fluids? Explain with a neat sketch showing the relationship between shear stress and velocity gradient for various types of fluids. | **6** | **2010** |
|  | **(b)** | A 50mm dia. and 0.10 m long cylindrical body slides vertically down in a 52 mm dia. cylindrical tube. The space between the cylindrical body and tube wall is filled with oil of dynamic viscosity 1.9 Ns/m2. Determine its velocity of fall, if its weight is 60 N. | **6** |